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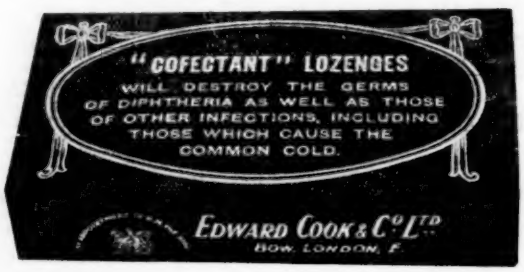
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# The Chadwick Lectures
ON
# TYPHUS FEVER IN SERBIA.

*Delivered at the Royal Society of Medicine on Oct. 20th and 29th and Nov. 3rd, 1915,*

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## LECTURE III.[1]

### PROPHYLAXIS AND TREATMENT OF TYPHUS.

MR. PRESIDENT AND GENTLEMEN,—Our knowledge of typhus at present, unlike our knowledge of enteric fever, is insufficient to enable us by any form of inoculation to afford such a measure of immunity to the individual as has been effected with such conspicuous success in the case of enteric fever and to which the small mortality from that disease in the present campaign is so largely due. Since, then, we cannot attack the germ or seed of the disease directly, we must proceed indirectly by attacking the supposed carriers of the germ, and by improving the general environment and circumstances of the individual render him less liable to fall a victim to the disease. Where we have no control over the seed we can still do much by our action upon the soil.

From what has been said in a previous lecture it will be realised that the three main factors associated with the production of typhus are (1) dirt, (2) overcrowding, and (3) destitution. These, therefore, are the things which any public authority must attempt to overcome in order to render a community free from liability to typhus.

*Sanitation and Personal Cleanliness.*

Now, as regards the first of these factors—dirt—a great deal may be done by sanitary legislation and a suitable system of drainage for the promotion of cleanliness, and in England, which is rightly regarded as the pioneer country in all sanitary matters, a great deal has been done to ensure the cleanliness of our towns. To this very largely we may ascribe our almost complete freedom from typhus during the past 40 years, and, indeed, it constitutes one of the triumphs of the founder of these lectures. On the other hand, personal cleanliness is a good deal a question of habit and tradition, and cannot be inculcated on a people in the twinkling of an eye. Chadwick himself was never tired of insisting upon the importance of personal cleanliness, thus he says in one of his writings: "Of the lessons that may be taught in schools the practice of cleanliness is of the highest order. A filthy population is everywhere a low moral population, but it is futile to enforce cleanliness in the absence of proper appliances for its practice. Five washed children may be sustained on the food requisite for four that are unwashed to bring them up to the same condition. Besides, the washing itself is preventive of infections and of contagious diseases, such as the itch and other disease. We have various leagues, temperance leagues and others, to promote social reforms, but in my view the most important league we could have would be a national league for the enforcement of personal cleanliness and regular ablutions as a means of protection from epidemics as well as for promotion of the general health. ..... A trade rule, if work people could be brought to understand or to make it, that no one should be allowed to leave his work unwashed, or to join in work unwashed, would be of far higher economical importance to their class, would tend more to their social elevation, than all the trades unionist regulations put together." It has also been said that "in our Indian cities Musselmans who are distinguished for their attention to ablutions, though exposed to the same bad atmosphere as other people, are distinguished also by far less suffering from epidemics." Curiously enough the Turks, of whom there were a very large number in Skoplje, whose towns, streets, and houses are everywhere throughout the world a byword for all that is filthy and vile, chance to be fairly clean personally, owing to the frequent ablutions enjoined on them by the Mahommedan law, and, on the whole, there is reason to think that they suffered less than the Serbians from the typhus epidemic.

*Overcrowding and Ventilation.*

Overcrowding has to be combated by the free admission of fresh air. Here we are unable to do much by direct legislation; true, indeed, the abolition of the window tax did much negatively to admit fresh air into the dwellings of the poor, but we must look for a long period of education before the importance of fresh air is realised in practice from the t p to the bottom of society. It is no use telling people that they must have open windows when they are insufficiently clad, and when the numerous cracks and crevices in roof and walls make them only too anxious to obstruct all currents of cold fresh air. In any given town a sufficient amount of cubical space should be allowed, at least 500 cubic feet per head with free ventilation—i.e., the supply of 3000 cubic feet of fresh air per head per hour. Ventilation has a marked influence on the contagion of typhus, and the prophylactic importance of it cannot be too much emphasised. Those sick of typhus should be treated in large, well-ventilated wards, from 1500 to 2000 cubic feet being allowed to each patient, and the beds should be at least 6 feet apart. Even in winter there is but little danger of catching cold while the fever lasts; and there is good reason to believe that an abundant access of fresh air may positively control the bronchial catarrh and other pulmonary affections of typhus, which do not result from cold but from passive hyperæmia of the bronchial mucous membrane and of the parenchyma of the lungs. The importance of ventilation is further shown by the way in which the season of the year affects the death-rate; thus it drops to a minimum as summer advances, but rises to a maximum in late winter and spring, this increase being probably due to the concentration of the poison in close rooms. The poison has always been found most virulent when large numbers of persons have been crowded together in improperly ventilated and ill-kept localities under bad hygienic conditions; thus prisons, badly planned barracks, inns and lodging houses of the lowest kinds, workhouses, ships, and defectively built hospitals are the chief foci of the disease—hence the synonyms for typhus, namely, "prison fever," "ship fever," "lazaretto fever," "camp fever," and so forth.[2]

*Destitution.*

We have seen in the first lecture how often typhus has followed upon bad harvests, particularly in Ireland, and the consequent wretchedly ill-nourished condition of the people. This difficulty has been overcome in the British Isles by the supply of cheap imported food from abroad. Now, it is the difficulty of providing an adequate amount of good food which constitutes one of the causes why typhus is so frequent an accompaniment of armies in the field and besieged garrisons. In the latter case the reason is fairly obvious; but armies in the field which begin with proper supplies of food often, owing to the exigencies of war, become separated at least temporarily from their base, and then begins the necessary evil of half or quarter daily rations. To supply armies in the field continuously with suitable and sufficient food has always been a great military problem, never, perhaps, so satisfactorily solved as by the English and French armies in the present war. This question of commissariat was certainly a great difficulty in Serbia, as it must be for any country which has not had long training in elaborate forms of organisation. Serbia, too, one must remember, has had two wars since 1912, prior to the outbreak of this one, and by the victory of December, 1914, she became saddled with 67,000 Austrian prisoners, thus imposing a further serious strain upon her food-supply.

*Hospital Arrangements at Skoplje*

Skoplje, to which my personal experience has been confined, is a large town of some 30,000 inhabitants, a considerable number of them being Turkish; there is, in fact, a Turkish quarter of the town. Until the Balkan War of 1912 it was Turkish and rejoiced in the Turkish name of Usküb. It is a most beautifully situated town, surrounded by snow-capped mountains and watered by a rapid flowing river—the Vardar—which enters the sea at Salonika. Some of its

[1] Lectures I. and II. were published in THE LANCET of May 27th (p. 1069) and June 3rd (p. 1111), 1916, respectively.

[2] Nothnagel's Encyclopædia, article Typhus Fever, English edition. p. 489

admirers have compared it to Florence. It is of considerable antiquity and by some authorities considered to be the birthplace of the Emperor Justinian. The Serbians are justly proud of it, as it was their ancient capital in the fourteenth century when the Serbian Empire in the famous reign of Stephen Dusan extended over the greater part of the Balkan peninsula, but on the fatal field of Kossovo (1389) the Serbians, owing to treachery, were defeated by the Turks and Usküb was lost to Serbia for more than 500 years.

In this town there were some six hospitals, or rather buildings temporarily converted into hospitals, but they were not situated in places most suitable for hospitals. The first thing to be done on the outbreak of the epidemic was to establish a hospital for typhus cases only, which should be quite outside the town. This the English proceeded to do largely owing to the energy of Lady Paget, acting in conjunction with the British Red Cross Society. Accordingly, two buildings were placed at their disposal by the officer in command of the district, with the promise of three more to follow shortly; they were situated about one and a half miles out of the town on a hill in most healthy surroundings. The Serbian authorities quickly perceived the importance of this method of combating the disease and assisted energetically; a system of compulsory notification of the disease was begun which was much in advance of anything that had been done before. There were also instituted compulsory isolation of cases, compulsory disinfection of houses and clothing, compulsory formation of observation wards in all the hospitals, compulsory examination of all passengers leaving trains at Skoplje, and compulsory closing of all public places, churches, mosques, theatres, &c. Much of this was a counsel of perfection, as it was clearly impossible to put such unwontedly drastic measures into operation all at once.

Another large hospital, known as the Polamecetz (half moon), already existed on the outskirts of the town. It had been built by the Turks a few years previously as an isolation hospital, and in general structure it was a fine building, though, in my opinion, too much space was devoted to administrative purposes. Here all kinds of cases were herded together—dysentery, enteric fever, typhus, erysipelas, scarlet fever, measles, diphtheria, and even cases of small-pox. Separated from the main building by some 20 yards, the Serbian authorities had erected two small "barracks" for the immediate reception of typhus cases, each containing about 27 beds; as the new hospital for typhus patients only was completed they were drafted off there. But for a time there was a great congestion in this hospital, the wards being at first awfully crowded; frequently one found two men in one bed, while often there would be three or four women in a ward of 16 or 18 men, and many typhus patients were at first mixed up with the more general cases in the main building, while dirt and uncleanness reigned supreme. On the whole, it was somewhat surprising to me that the typhus did not spread in this hospital to the non-typhus cases, in spite of the fact that many of the cases, at times owing to mistaken diagnosis but more often from actual want of space, were placed in beds next to cases of dysentery, relapsing fever, diphtheria, and other diseases. This may have been due to the fact that the wards themselves, though dirty, were large, bright, and airy; the window space was good and there was no difficulty in opening the windows, though it was not always so easy to keep them open when one's back was turned. Professor Curschmann, out of his large experience at a special typhus hospital in Berlin, says that "owing to the fact that the contagion is not easily carried to a great distance when an isolated case of typhus fever is admitted to a hospital by mistake or want of judgment, the disease does not spread beyond the patient's immediate neighbours, provided the wards are large and airy." It is easy enough to speak of free ventilation, but not so simple to carry it out when it is impossible to guarantee warm clothing. Days, and particularly nights, in Serbia during March and April may be quite cold, and frequently there are snowstorms It is no use insisting upon open windows if you cannot ensure adequate warm clothing for the patient. As some means of keeping the atmosphere sweet we used large spray syringes containing rather more than a pint; these were filled either with perchloride of mercury 1 in 2000 or with carbolic acid 1 in 20, and sprayed about the wards—the walls and floor, particularly under the beds, to the manifest delight of the patients.

*Conveyance of Infection.*

Although we do not know the specific cause of typhus, yet all analogy points to its being due to a micro-organism, and though we are ignorant of the nature of this micro-organism,[3] so that we cannot destroy it directly, nor yet make any form of culture which by inoculation might serve as a prophylaxis against it, we do know that to a large extent the *materies morbi* is carried by lice, and that it is by the bite of these creatures that the poison may be conveyed. Hence the most direct way of stopping the spread of typhus is to destroy the lice. Whenever possible, prior to the admission to hospital all personal clothes, bed linen, &c., should be thoroughly heated and a careful search made for lice on the skin and in the hair. After admission to the hospital careful watch should be kept for lice in order to be certain that none have escaped detection. Several doctors in Serbia considered that there was a great advantage in thoroughly anointing the body with some form of petrol, of which hemijelli is the best known. Dr. Howard Barrie, who was at the head of the English Red Cross in Serbia, employed ordinary kerosene, such as is used for lighting. Where the oil irritates the skin unduly it was found useful to dilute it with ordinary vaseline, equal parts of kerosene and vaseline forming an excellent application for delicate skins. This proved to be an efficient and economical insecticide. Doubtless, if one has at hand all necessaries the most useful method of dealing with an epidemic such as that which has ravaged Serbia would be that suggested by Dr. Hort—namely, to have an unlimited stock of hospital tents, which should be frequently moved, unlined clothing which will stand dry heat, and large galvanised tanks containing carbolic solution for the reception of infected urine.[4]

The possibility of the typhus contagion being conveyed by lice was realised as far back as 1876 by Murchison, who said that it was essential for the body to be protected from lice. Though there would seem to be but little doubt that lice are effective agents in transmitting the contagion there is no reason to think that this is the only method, but that it may also be received by direct inhalation. Such was the opinion of Murchison, and I found it was shared by many Serbian doctors, who had had much experience of typhus in Russia and in an epidemic at Adrianople. This certainly is my own opinion. The way in which typhus so often attacks doctors and nurses who are brought into close contact with the patients would seem to point to the likelihood of this more direct mode of infection. It is probable that for some time before and after as well as during the febrile period of typhus fever the contagion continues to reproduce itself in the immediate surroundings of the patient. During this time it undoubtedly attaches itself to the dust in the atmosphere and is easily transferred to inanimate objects handled by the patient, on which under favourable circumstances it may maintain its virulence for some time. Among these objects are clothing, underwear, bedclothes, carpets, upholstered furniture, and, in fact, all objects with a rough, woolly surface.[5]

All epidemics vary greatly in their type of severity; as a rule, in any given epidemic the more severe cases come first and the poison seems gradually to lose its virulence. In the United States the disease is nearly always of a mild type, and this is considered, and with reason, by American authors to be due to the excellence of the hygienic surroundings for which America is justly famous. The mortality there has been reported as having been as low as 1 per cent., which is practically unheard of elsewhere. In an interesting account of an epidemic which occurred recently in Palestine (1913–14) Dr. C. H. Corbett said that the mortality in the prisons of Jerusalem reached as high as 50 per cent. As showing how the infection may be transmitted by clothes, Dr. Corbett gives an instance of infection from a mattress which had been disinfected and exposed for some days to the brilliant sunshine of Palestine. This mattress was then unpicked to be remade. The man engaged in this work was attacked by the disease; he was treated in his own home by a Turkish doctor without suitable nursing and he died.[6] The belief in the connexion of typhus infection with clothes is shown by

[3] A number of observers have cultivated from the blood organisms of a diplococcal nature.
[4] E. C. Hort, Brit. Med. Jour., April 13th, 1915.
[5] Nothnagel's System of Medicine.
[6] Brit. Med. Jour., May 22nd, 1915.

the Spanish word for the disease, "tabardillo," which means a peasant's cloak.

*Preventive Measures Advocated Early Last Century.*

It is curious to read now of the prophylactic measures to be adopted against typhus which were recommended early in the last century by Hildebrand, of Vienna, who appears to have had some inkling of the distinction between typhus and enteric fever before the English, French, or American physicians had recognised it. Thus he writes:—

1. Never approach a case of typhus on an empty stomach, or when the body is wet and cold. It is always better to take some wine or brandy or some small meal, or to make the body less receptive of infection by moderate warmth.
2. At the patient's bed one must diligently blow the nose; it is advisable to hold strong smelling substances in front of the nose and to wash the mouth with vinegar.
3. Smoking tobacco is more important before than after the visit to the sick bed.
4. After the visit one must carefully wash the hands and face with cold water. Clothes must be changed and the old ones cleaned by washing or smoking.
5. Always avoid woollen clothing, which, however, according to the ordinary custom it is scarcely possible for men to do.
6. Cold is the greatest prophylactic against all animal infection; the use of a cold bath or repeated cold washing of the whole body or rubbing the same with snow protects against a developing typhus or even obliterates it in its beginning.

Anticipating modern sanitary legislation, Hildebrand says that the prevention of typhus should be an important part of medical policy. The same measures should be applied for getting rid of typhus as for the removal of oriental plague. As public measures he recommends:—

1. Special typhus hospitals should be established analogous to the English fever hospitals.
2. Typhus patients must be separated most carefully from people in health, and the private doctor must have the duty of doing this; if a poor patient he must be notified and taken to the hospital; if a rich man, a regular typhus isolation room must be made in his house, so that all further spread of the infection may be hindered. In fact, it would be better for people of position to be lodged in separate rooms in these hospitals rather than to run the risk of spreading the infection.
3. In large communities one must see to the separation of the typhus patients from the healthy as soon as possible; jails and reformatories should have their special typhus isolation wards in the vicinity.
4. Care should be taken as to the method of conveying the typhus patient to the hospital, infection is easily spread by the carriages used.
5. The wards and rooms should be very strictly isolated from all others; there should be special doctors, nurses, and priests to attend upon the sick, who should clean themselves most carefully on going out.

He goes on further to say that typhus frequently breaks out in time of war, because soldiers, specially recruits, are in too confined a space; he says that the "field hospitals" should be fixed and treated by the opposing armies as if they were "free states." I am afraid this recommendation will hardly be followed, after our experience of how free states are treated by the coryphæi of modern civilisation.

*Measures of Inspection and Disinfection.*

In all large cities, especially during the times of epidemics, the tenements of the poorer population, the poorer inns and cheap lodging-houses, all institutions for those who have no homes, workhouses, poorhouses, and prisons should be carefully inspected by the authorities. All ships, and particularly emigrant ships, should be subjected to a careful inspection. Special attention should be devoted to tramps and their lodgings, also taverns, asylums, prisons, and railway stations. Every suspicious case should, if possible, be isolated either on the spot or in the nearest suitable hospital.

The best method of disinfecting bed-linen and outer clothing consists in the use of steam; iron bedsteads, which ought to be of the folding variety, should be exposed to it. Excellent high-pressure steam disinfectors, known as "The Velox," have been made at Stirling by the Grampian Engineering and Motor Company, and some 50 have been sent by the War Office to Serbia. The machine is provided with a vertical tubular boiler specially adapted for burning wood fuel, as coal and oil may often be unobtainable in Serbia. Plates, glasses, spoons, and forks only require washing in hot water, as the contagion does not adhere to objects with a smooth, non-porous surface. It is well always to add some disinfectant to the water used in washing patients after profuse perspiration, but the exact relation of the excretions of the body to the poison of typhus fever is imperfectly known. In disinfecting the wards and rooms which have been occupied by typhus patients one must bear in mind that the disinfection of the ceiling is more important in typhus fever than in many of the other acute infectious diseases. The floor should be carefully scrubbed with soft soap and carbolic acid, special attention being paid to the joints; after that it is rubbed off, waxed, and painted. Immediately after admittance to the hospital the patient should receive a bath and be carefully cleansed; his clothing and underwear should be properly disinfected and kept in large well-ventilated rooms at some distance from the wards until he is discharged. The patient should be dressed in clothing provided by the hospital and strictly isolated. In small towns where no time has been given for preparation, when the first cases are discovered infected material can easily be buried in the open air in some vacant field.

Free ventilation being the most potent method of combating the poison of typhus in the disinfection of wards or sick rooms after the recovery or death of typhus patients, the rooms should not be closed as is the case with other infectious diseases, but they should be kept open for a number of days, well ventilated by throwing open windows and doors.

TREATMENT OF TYPHUS.

Unlike enteric fever, there is not so much that is special to be said about the treatment of typhus. The old methods of blood-letting, emetics, and large doses of quinine, perhaps dating from the time when it was still confused with malarial fever, have long since been abandoned. To quote again from Hildebrand on this point:—

After a dispassionate survey of all these hypothetic methods of treatment, it is noted at once how short-lived they were, how little, therefore, was their true value, and how inadequate they were in practice. We may in the future expect as many more such doctrines and systems of therapeutics as there will be hot-heads and visionaries in our art. But if, on the contrary, we follow the path of observation and successful experience in these cases—in other words, the path of empiricism guided by reason—our free and untrammelled judgment will lead us on to new and better views than can be hoped for from a brain that is ruled by hypotheses.

It need hardly be said that absolute rest in bed is essential; the sick-room should be large and airy, with the windows open night and day; as far as possible the hospital attendants should be individuals who have been rendered immune by an attack of the disease. This practice was followed as far as possible in Serbia, where many of our hospital attendants were Austrian prisoners who had come unscathed through the disease. An important point is that the sick-room should contain only what is indispensable for the care of the patient. Mirrors, conspicuous pictures, wall-paper of glaring design—in fact, any brightly coloured or prominent object should be covered up or removed. Such objects readily feed the morbid imagination of the delirious typhus patient, enter into his hallucinations, aggravate his delirum to the point of mania, and so give rise to incalculable harm. Curschmann mentions a patient who smashed into fragments a mirror that hung opposite his bed, because he mistook his own image for that of an enemy, and another who jumped through the window because he was terrified by a painted head on the side of a porcelain stove, which he though was alive and seemed to him to bear a frightful expression.

*Thorough ventilation* is really the most important factor in the treatment—not only is it the most efficacious antipyretic, but also it has a very favourable effect upon the nervous system; the violent headache and insomnia of the early stages of the disease are lessened by this method more than by anything else. The intensity of the delirium is diminished and the mental condition of the semi-comatose patient appears to be favourably influenced. During an epidemic which occurred in Paris in 1893, Barrault, a French physician, maintains that he reduced the mortality considerably by an energetic open-air treatment.

*Hydrotherapy and Diet.*

Hydrotherapy, as in enteric fever, is one of the best methods of reducing the pyrexia and soothing the nervous system. It can be effected either by (1) cold baths, (2) the

local application of cold, or (3) the water mattress, the water of which should be not be below 65°–70° F. The ice cap, or Leiter's tubes, or small pillows filled with iced water may be used to combat the insomnia; sponging several times a day with vinegar and water is very helpful. The baths are particularly useful in stuporous or comatose conditions. They also greatly relieve the violent headache and insomnia of the initial stage. The frequency with which the baths are given should depend less on the amount of the body temperature but more on the condition of the central nervous system, the pulse, and respiration; the actual reduction of the temperature *per se* is not so important. In cases of serious delirium with tremors I have certainly found morphia injections most beneficial in circumstances where, as in Serbia, any form of cold-bath treatment was out of the question. It may also be given without risk to combat the insomnia, which is often a most troublesome symptom.

Diet is a fairly simple matter, as the principles to be observed are the same as for all the specific fevers except enteric fever, which, owing to the ulceration of the intestine, must have special rules of its own. Briefly, then, the diet should be mainly milk, rendered more palatable perhaps by the addition of some mineral water, and this in many cases is all that is necessary; often it may be advisable to give in addition eggs, soups, or beef-tea. There is no absolute objection to giving solid food if the patient's mental condition is such as to admit of his swallowing it, but as a rule he is better without it until the temperature has become normal. After that solid food can always be given at once; the patient may have a ravenous appetite, and there is no objection to its being gratified. After venesection went out of fashion as a method of treating fevers in the main, what is known as the supporting treatment has been generally adopted, and in the case of typhus, which is a most devitalising disease, this seems perfectly sound. But when the expression "supporting treatment" is used it often seems to imply the employment of alcohol. This is not in the least necessary as a routine measure in an uncomplicated case, and in the Balkans there is a strong prejudice against the use of brandy which probably is well founded. In former days heroic doses of alcohol were given by our ancestors, such as the two bottles of madeira daily for several days ordered by Dr. Carmichael Smyth to a Spanish prisoner in the jail at Winchester, or the two bottles of port in 12 hours to another, who recovered. Typhus cases may terminate with sudden heart failure, and when there are signs of failing circulation stimulating remedies, among which alcohol is an important one, should be energetically employed. Apart from possible complications of the respiratory system, one's attention has to be directed mainly to the nervous system, which suffers from the intensity of the toxæmia, and to the heart, which often succumbs to the severity of the disease. At the end of the febrile period, if there are no complications, the convalescence from typhus is usually said to be rapid as compared with other acute infectious diseases, but it was noted that the English who were affected by it were much longer in recovering their strength than the Serbians.

### *Sanitary Science and Public Health.*

Before concluding this course of lectures, founded as they were for the promotion of public health, and perhaps with the idea at the back of Chadwick's mind of the ultimate abolition of the medical profession, I should like to say a few words on the more speculative aspect of the philosophy of public health. So far it would seem that the main triumphs of public health and sanitary work have been in connexion with acute disease, of which typhus is the classic example, and their success in this sphere is all the more astonishing as Great Britain and Ireland were the special homes of typhus prior to the advent of the medical officer of health. The disappearance of cholera, too, of relapsing fever, and the diminution of enteric fever may be set to the credit of advancing sanitary science, and the question arises, How much more progress can be expected in this direction? Are the possibilities of sanitary science exhausted when we have dealt with acute and epidemic disease? It must be patent to anyone who has reflected much on the history of the evolution of medicine that acute diseases were much more prevalent in the ancient world and in more primitive societies, whereas chronic diseases are more conspicuous in the modern world and in more advanced societies. To Plato, as to the ancient world generally, disease was a tiresome and meaningless exception to the ordered regularity of a harmonious life; it was a kind of square root which would not come out, belonging to the realm of τὸ ἀπέραντον, which no philosophic mind would waste time in studying. The ordinary citizen, in this view, ought to be, and indeed probably was, healthy, sane, and strong, and the man who was properly occupied had "no leisure to be ill." It is some confused recognition of this fact which has led men like Tolstoi to rail at doctors and to say that Medicine promotes disease, whereas the truth is that the advances in material civilisation, while diminishing epidemics and acute disease, do certainly seem to increase chronic disease; and so much is this the case that an interesting modern writer—Mr. Edward Carpenter—has written a book in which civilisation itself is regarded as a disease to which all nations fall a prey as they advance in material well-being; hence he called his book "Civilisation, its Cause and Cure." Now, advancing civilisation increases the complexity of the life both of the body and of the mind, so that it becomes more and more difficult to retain the primitive simplicity of our perceptions; into the flamboyant Ionicism of our modern life we require to introduce something of the sobriety of the Dorian mode, and the war brings this very closely home to us with its emphasis upon simplicity and universality. Here it is that the Chadwick school of thought may help us, for it is not merely by the legislature making sundry sanitary enactments that progress is made, but by engraving on the minds of the rising generation various precepts of health, and this can only be done by Education.

To many people sanitary science is apt to appear to be a mere matter of drains and open windows, and the enthusiasm about drains which possessed our fathers of the mid-Victorian epoch is well expressed in Mr. Mallock's parody of Ruskin's style in the New Republic, where Mr. Herbert is made to say: "I think a clean sewer is an entirely holy thing." But sanitation, as Chadwick understood it, goes far beyond the getting rid of epidemics and acute diseases; it endeavours to lay down rules for sound building, and it is not too much to say that the need of rational housing and proper town planning are among the greatest desiderata of all social reforms in this country at the present day. An adequate system of housing both for the country districts and the towns might diminish phthisis at least 50 per cent., and would probably lessen the consumption of alcohol from which flow such unnumbered ills. If the evils connected with these two scourges could be removed, we should have done more than our ancestors accomplished in their banishment of typhus from these islands. But here Sanitary Science must join hands with Education, or, rather, be recognised as being an integral part of it.

Just as a long period of peace may render a nation careless about preparation for war, so long immunity from disease may render a nation careless about its sanitary arrangements. Thus, although we have been free from any serious epidemic for many years, it is necessary for sanitary workers to be ever on the watch, as one never knows when something serious may break out, and particularly when the nation is spending these vast sums of money, roughly at the rate of £1,000,000,000 a year, we must be alive to the danger of local authorities getting into difficulties and relaxing their standard of sanitary effort.

Among the Ancients life was infinitely more simple than with us, but it must be confessed that to some extent the simplicity was purchased by ignoring some awkward facts such as disease and the discomforts of old age; indeed, with regard to the solution of many difficult social problems the ancient world had a genius for cutting knots which the modern world loves to try to untie.

It was said of the late Mr. Gladstone that he took an interest in almost everything except disease; this seems to me to have been a sound and healthy attitude to have taken up, though perhaps not a wholly philosophic one. For disease belongs to the negative things of life, and though it may be less interesting than many other things, it has to be reckoned with. Just as friction interferes with the law of perpetual motion, so disease shackles and restrains the untrammelled activities of our minds and bodies, and is consequently worthy of study even though it constrains us to embark upon that bewildering sea of particulars from which the ancient world in horror shrank.

# INTESTINAL DISORDERS ARISING FROM PROTOZOAL INFECTION.*[1]

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THE return to this country of large numbers of invalided soldiers from tropical and subtropical regions has brought to the notice of the clinical pathologist material of a nature such as he has previously rarely, or never, had an opportunity of examining. Many pathologists must be in the same position as myself, and have to decide the character of diseases which they never previously had an opportunity of seeing. The number of cases of amœbic dysentery seen in civilian hospitals in England is so low in times of peace that all of us have not had an opportunity of examining the causative organism in the fresh state. Under these circumstances we owe a debt of gratitude to Dr. H. M. Woodcock and to Dr. C. M. Wenyon for the papers which they have recently published in the *British Medical Journal* and THE LANCET respectively, and which describe and illustrate lucidly the different species of protozoa commonly found in the dejecta of man.

Since undertaking the duties of clinical pathologist to the Royal Herbert Hospital ten months ago I have had three cases showing Entamœba histolytica s. tetragena in the stools and one case with an infection by Lamblia intestinalis. All four cases present features of interest and require no apology for their presentation in the form of a paper. It is not my intention to discuss at length the morphology and biology of Entamœba histolytica and Lamblia intestinalis; these have been so well and clearly described by Wenyon that my non-acquaintance with these protozoa did not debar me from recognising their presence in characteristic form in stools.

CASE 1.—The first case which I saw was one of active dysentery under the charge of Captain (now Major) Starling. It occurred in a Eurasian, a gunner, aged 23 years, who had been born and brought up in India, but, whilst there, never suffered from dysentery. He left Bombay for England for the first time about the end of November, 1914, and was taken ill with diarrhœa about half-way through the Red Sea. He continued to suffer after reaching England, and had frequently to report sick, and on more than one occasion to lie up in hospital. He was admitted to the Royal Herbert Hospital on Sept. 12th, 1915, and was then passing 10 to 20 motions a day. On the 14th I examined his stools and reported amœbæ present, but, not having a warm stage at disposal, and failing to observe ingested red blood cells, the diagnosis of E. histolytica was not made. Three days later I obtained a freshly passed stool for examination. This stool presented large quantities of mucus streaked with blood. A fragment of mucus was teased out in saline on a glass slide and mounted on a warm stage. Examination of this specimen revealed large numbers of amœbæ crawling actively about and throwing out clear pseudopodia with incredible rapidity. Accurate measurement of these active forms was impossible, but they were about 20–30 $\mu$. The whole cytoplasm presented usually a faint greenish tint, and in a few specimens ingested red cells were detected. The relatively small nucleus was also made out in one or two specimens. Permanent preparations were fixed wet in alcohol-ether, alcohol, and formalin vapour, and stained in Giemsa and Heidenhain's iron alum hæmatoxylin. Dr. Woodcock was kind enough to examine these for me, and confirmed my diagnosis of Entamœba histolytica. Immediately these active forms were seen the patient was started on emetine injections. Forty-eight hours later he passed the first formed stool he had had for six months. After 12 grs. of emetine had been given the case was cured and left hospital on Oct. 5th, with strict injunctions to report to us should the slightest symptoms reappear. He has not been heard from since.

At the time I had this case under observation I was unaware of the fact that Schaudinn's description of the division forms of Entamœba histolytica was incorrect. It was later when I knew from Dr. Wenyon that the cystic forms of this parasite present characteristic and readily recognised forms—viz., circular outline, 10–14 $\mu$ in diameter, and with four daughter nuclei distributed in the cytoplasm. The stools from the above case were examined after emetine treatment had been started, but observation was especially directed to the detection of active forms, and these were not found.

The next case in which E. histolytica was found presented a very different character, but belongs to a type which it is extremely important to recognise, in view of the danger of spreading amœbic dysentery in the troops in this country and across the Channel. This was a case of true amœbic dysentery, which had passed the acute stage undetected, and had for months been harbouring the organism unsuspected.

CASE 2.—Lieutenant —— was admitted to the Royal Herbert Hospital on Dec. 6th, 1915, as he had been suffering from fever for ten days. His liver was enlarged and tender, with resistance over the gall-bladder. As he gave a history of having had typhoid fever in South Africa 18 months previously his excreta were examined bacteriologically, but the test was negative. On Dec. 14th, I saw the patient for the first time, and carried out a leucocyte count which came out at 15,000. A differential count especially directed towards the detection of an eosinophilia showed no abnormal feature. Three days later the patient's general condition was improved, and his leucocyte count was down to 14,000. Further cross-examination of the patient, however, brought to light a new and an important diagnostic factor. During April, May, and the first half of June he had had a colitis in South-West Africa. This colitis he described as being severe: diarrhœa and passing of mucus tinged with blood. During the acute stage the motions were as frequent as twice an hour. No injections had been given to him, but he gradually recovered. The diagnosis of his present condition being now probable a saline purge was given, and the resulting motion was examined on Dec. 19th. A small particle of mucus adhering to the outer surface of the firm brown stool was teased out in Gram's iodine solution (double strength) and examined under an oil-immersion lens. Numerous encysted forms of Entamœba histolytica were seen, presenting the four characteristic nuclei, and measuring on an average 12 $\mu$ in diameter. Emetine, ½ gr. t.d.s., was given hypodermically on 12 successive days. The stools were examined again on Dec. 29th, but no E. histolytica was found. A typical cyst of E. coli, however, was present, showing the eight daughter nuclei quite distinctly. It was circular in outline, and measured 22 $\mu$ in diameter. The patient felt so fit after the course of treatment that he was discharged to duty at his own request on the 31st. He has been advised to have his stools examined once a month, for three or four months, and to report at once on the reappearance of any symptoms.

CASE 3.—The third case in which I found the pathogenic amœba was that of an officer in the Royal Army Medical Corps who contracted the disease in Egypt about the beginning of April, 1915. After a week of constipation severe diarrhœa started, accompanied by griping and tenesmus. The stools contained mucus streaked with blood, and for three or four days were passed 10 to 20 times per diem. Later this settled down to three or four motions a day, but mucus and streaks of blood still persisted. The sole treatment adopted was the use of astringents. This chronic state lasted for three or four months, with occasional exacerbations, accompanied by vomiting and a rise of temperature to 102° F. For four months a formed motion was not passed. Admitted to hospital in Alexandria on July 22nd, he received 40 injections of emetine, 20 grains in all. The diarrhœa stopped after three days, and in a week a formed motion was passed, although mucus was still present. He returned to England on August 23rd, and was then quite well, excepting that the bowels moved twice a day and there was present a trace of mucus in the stools. After a month's leave he returned to light duty, but still suffered occasional mild exacerbations with three to four stools a day, when a little mucus was passed, but no blood.

On Jan. 5th, 1916, I examined a motion obtained after a saline purge and found numerous encysted forms of Entamœba histolytica, there being two or more present in each field of the oil-immersion lens. The large majority of these were of the immature type, and presented only two nuclei, or in some cases three. Several of the binuclear forms were measured and found to be only 9 $\mu$ in diameter. Further search soon revealed larger forms, 13 $\mu$ in diameter, which contained four characteristic nuclei; and it was only when these were demonstrated that the patient, himself a microscopist, was reluctantly compelled to acknowledge the certainty of the diagnosis. Emetine injections, 1 grain per diem for 12 days, were started on Jan. 7th. Three days later the number of amœbæ present was greatly reduced, this reduction affecting especially the immature binuclear forms, but a careful enumeration of mature and immature forms was not done. Four days later amœbæ were still present,

* In the carrying out of such research work as I have been able to undertake I have been greatly helped by a grant in aid from the Medical Research Committee of the National Health Insurance.

[1] This paper was received on Jan. 30th last, but pressure on our space has prevented its earlier publication.—ED. L.

but only two or three were present in each preparation. After six days of emetine treatment the stool resulting from a saline purge was examined, and this time a careful search failed to detect any amœbæ. The patient declared he felt very much improved in general condition, despite the insomnia due to the emetine. Up to date there has been no reappearance of the organism in the stools.

CASE 4.—The fourth and last case of protozoal infection to be described constitutes an interesting commentary upon the three genuine amœbic dysenteries given above. Here, as in Case 3, the value of the anamnesis is enhanced greatly by the circumstance that the patient was a medical man, a student of medicine holding a combatant commission. Lieutenant ——, aged 23, was quite well until the beginning of August, 1915, when the ship, on board which he was proceeding East, called at Malta. He went ashore in the afternoon, but whilst on land can recollect having taken only one glass of lemonade. The evening of the same day he was seized with abdominal pain and severe diarrhœa, which lasted 24 hours. Nothing further noticed until seven days later and four days after landing in Egypt, when the diarrhœa recommenced and gradually got worse. He was passing four to six stools a day; these were very loose and watery, but never showed blood or mucus. He was admitted to hospital on August 8th, 1915, at which time the motions were 10 to 15 a day, but rarely disturbed him at night. In hospital he received 41 injections of emetine over a period of three weeks, but the diarrhœa did not stop, and he felt rather worse. The cessation of injections was followed by some improvement and he returned to duty. The diarrhœa, however, continued and he became weaker, and was finally invalided home on Oct. 23rd, 1915. The diarrhœa ceased on the way home and, apart from the effect of a mild dietetic indiscretion, he has been in good health since. He was admitted for observation to the Royal Herbert Hospital on Jan. 2nd, 1916. On the 7th a stool, the result of the administration of a saline purge, was submitted to an examination for amœbæ, and presented the following characters: Light brown semi-fluid motion; no foul odour; free from blood and mucus. A small loopful of the more fluid part was rubbed up in a drop of iodine solution, mounted, and examined with an oil immersion. No active or encysted forms of amœbæ were to be seen, but each microscopic field showed numerous cysts of Lamblia intestinalis. These were oval bodies measuring 14 $\mu$ long and 10 $\mu$ broad, surrounded by a bright refractile capsule. In Dr. Wenyon's paper on p. 1181 Figs. 5 to 8 illustrate the appearances seen. In the specimens examined from the case under discussion the capsule was more distinct than in the illustrations just noted, and at first sight suggested rather that one had to deal with the ova of a metazoon. Their size, however, the presence in several of a well-marked oblique line separating the two daughters, the two or four polar nuclei according to the stage of development, all presented a picture which, once observed, could never again be mistaken. Permanent preparations were made and stained. They confirmed and amplified the observations made on the fresh specimens.

Where the patient contracted the infection cannot be placed with certainty, but it is most probable that the Lamblia obtained entrance into his alimentary tract immediately on his arrival in Egypt. Whether he had ever had a true amœbic dysentery is more than doubtful. The failure to react to emetine, the spontaneous recovery from the diarrhœa after reaching cooler latitudes, and the subsequent establishment of a lamblial infection all render it more than probable that his whole disorder was due not to E. histolytica, but to Lamblia intestinalis. Without straining unduly, the clinical history, as given by the patient, can only be interpreted as pointing towards the accuracy of this view; most certainly it does not accord with the symptomatology of an acute amœbic dysentery.

This case is now being treated with thymol in the hope that the infection may be suppressed or abolished, but at present the therapeutic treatment of this lamblial infection is very unsatisfactory and requires further research. In this connexion the following experiment which I undertook is of interest, and may prove to be of considerable importance.

To obtain, if possible, confirmatory evidence of the conversion of the encysted form into the free swimming flounder-like active form, animal experiment was resorted to. A loopful of the fluid part of the stool (which had now stood two days at room temperature) was rubbed up in about 5 c.c. of milk. By means of a pipette and teat some of the milk was introduced into the pharynx of three mice, two of whom took it readily. Three days later one of these mice was killed, and the contents of the bowel examined at various levels. Down to 2 inches below the pylorus numerous freely swimming typical lambliæ were found. These were 14 $\mu$ long and had the typical structure. In the lower part of the bowel these were absent, and the few cystic forms seen and measured were about 10 to 12 $\mu$ long. The two inoculated mice remaining were then sacrificed and examined, but only a negative result was obtained. Three control mice living under identical conditions, but which had not been fed on the lamblia-containing fluid, were also killed and examined without result. Perhaps I was too precipitate in sacrificing the infected mice, and had the infection been allowed to run on longer it is possible all would have contained active lambliæ in the upper bowel. It cannot be regarded as an established fact that I infected the first mouse with the protozoon in question; the possibility of a spontaneous infection must be taken into consideration. Still, given two dozen mice, encysted lambliæ, and ten hours microscopy, and the question can be decided within a week. Should the result be regularly positive, ideal conditions are at once granted for the testing of various compounds with the view of finding a therapeutic agent resembling in efficacy that of emetine against E. histolytica.[2]

The three cases of amœbic dysentery described above require little comment. Diagnose the condition and give emetine. The third case, however, is of some interest. Two courses of treatment by emetine failed to prevent the establishment of a chronic dysentery. Alternative views to explain this phenomenon are, first, an anatomical, and secondly, a biological. It is possible to conceive a few amœbic cysts locked up in a fragment of more or less dried intestinal content, perhaps lodged in a crypt where the emetine could not obtain access. Another possibility remains to be considered. It is a well-established fact that certain trypanosomes, easily killed by a particular organic compound of arsenic, may after exposure to this drug under conditions not exactly determined become insusceptible to the action of this very arsenical compound. This insusceptibility or arsenic-fastness remains a character of a trypanosome through subsequent generations. In the third case the dysentery relapsed after prolonged treatment with emetine, and the conditions for the establishment of an emetine-fast amœba were presented. Fortunately, however, the cause of the relapse did not lie in the presence of a permanently emetine-fast amœba. The whole question why certain cases relapse is one urgently demanding further research.

In conclusion, the problem for the clinical pathologist is to recognise the causative organisms in the stools. Accurate measurements must be made of these by a micrometer eyepiece, whose value has been reckoned out for the various objectives by means of a ruled slide. For the study of active amœbæ from an acute case of dysentery a warm stage is indispensable. In detecting the encysted forms of E histolytica double strength iodine solution, recommended to me by Dr. Wenyon, has proved of great service. The solution is made up similarly to Gram's solution, only double quantities of iodine and potassium iodine are measured out. A small particle of the stool is teased out in a drop of this solution on a glass slide, covered with a glass slip, and examined by a weak diffuse light under the oil immersion. The nuclei of the amœbæ stand out distinctly, and the central dot (karyosome) can usually be made out.

For further cytological study and the permanent preservation of interesting specimens, the following technique has given excellent results in my hands. A very thin film is made on a slide which before drying is immersed in corrosive sublimate-alcohol solution (one part of 6 per cent. watery corrosive sublimate to two parts of absolute alcohol). The slides are left in this over night, then washed in alcohol of decreasing strengths, and finally in distilled water. For staining Heidenhain's iron-alum hæmatoxylin or Giemsa solution may be used. The latter is the more universally obtainable stain and gives excellent results with amœbæ. To a watch-glass filled with distilled water add the Giemsa solution drop by drop, one drop of stain to each cubic centimetre of water, and invert the film over the staining solution. After an hour the preparation is washed in distilled water for a few minutes, then run rapidly through alcohol into xylol, and mounted in neutral balsam. The Giemsa stain which I have at present colours the

[2] This experiment has since been performed and the possibility of the experimental infection of mice placed beyond doubt.

amœbæ a delicate rose-pink, which enables them to be readily picked out from the generally purple background. The deeper red nuclei stand out very distinctly, and the rod structure present in the cytoplasm is stained a deep purple. The amount of shrinkage obtained in using the above fixative is very slight; quadrinuclear cysts have, when measured in the stained preparations, been found to be 12 $\mu$ in diameter, whilst the rod structure attained a length of 6 $\mu$.

*Bibliography.*—1. H. M. Woodcock: Brit. Med. Jour., Nov. 13th, 1915, p. 709. 2. C. M. Wenyon: THE LANCET, Nov. 27th, 1915, p. 1174.

# LAMBLIA INTESTINALIS INFECTIONS FROM GALLIPOLI.

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THE bacteriological supervision of convalescents from enteric fever and paratyphoid fever, as insisted upon by the War Office, while entailing a vast amount of work on a scale hitherto not attempted, has afforded the bacteriologist an opportunity of studying several interesting conditions. For some months we have been engaged in this work, and as a matter of routine we have extended our investigations to include all cases of "dysentery." It is to certain of the latter cases that we propose to confine our present paper. It seems to us that the term "dysentery" has been fairly freely applied to most of the cases of diarrhœa sent home from the Near East, apart altogether from the question whether the condition be due to a pathogenic organism or to some other irritant.

In the course of an investigation of 136 consecutive cases of "dysentery" invalided home from Gallipoli we have met with 12 cases in which the bacteriological findings and the history suggest that the condition was dependent upon infection by Lamblia intestinalis. We have found no difficulty in recognising this flagellate, as in the majority of our cases it was present in the fæces in considerable numbers and is quite characteristic in appearance. We need not enter into a description of its characteristics, as this has already been done quite recently by Wenyon[1] and by Woodcock,[2] and anyone accustomed to microscopy who read their articles will easily recognise the parasite. In our microscopy of the fæces we have found emulsifying them with double-strength Gram's iodine, as recommended by Wenyon, most useful for bringing out the encysted forms of the protozoa and staining their nuclei, and so aiding in their identification.

The pathogenicity of Lamblia intestinalis is a question which is still not beyond the regions of doubt, hence it is only by the detailed study of series of cases like the present that the matter can be finally settled one way or the other. Within recent years several observers have recorded cases apparently of lamblia infection giving rise to a chronic dysenteric condition which resisted all the usual methods of treatment. Wenyon[3] has had under observation two or three persons who have maintained their infection for years. Some showed repeated attacks of diarrhœa with passage of mucus, and one case, although passing lamblia in large numbers, showed no signs of intestinal derangement. The persistence of the infection is well illustrated in our series.

CASE 1.—The patient, aged 32, went direct from New Zealand to Egypt and was stationed at Cairo for five months before proceeding to the Peninsula. He enjoyed good health while in Egypt, and left at the beginning of April, 1915, for "Anzac" where he landed on April 25th. On the voyage across the Mediterranean the ship called only at Lemnos, where the patient went ashore for an hour or two. He was six months at "Anzac" before being taken ill. When the "dysentery" attacked him the symptoms were severe, frequently 30 motions per day, chiefly blood and mucus being passed. These were associated with tenesmus and colicky pains in the abdomen. Five days after the onset of the illness he was sent straight back to England, where he arrived at the Brook War Hospital on Nov. 9th, 1915. He received six emetine injections while on the Peninsula and two while on the hospital ship. He thinks that these injections diminished the blood in the motions but had no effect on the mucus, which continued to be passed in considerable amount until he reached this country. Since arriving here his condition has slowly improved, but he still passes a little mucus in the motions. He has had no fever since admission to hospital here.

The excreta were examined at the Addington Park Laboratory on Dec. 15th, 1915, and again on the 24th, and found negative on each occasion. The fæces and urine were sent to us for examination on Jan. 4th, 1916, and again on the 10th. We failed to isolate any typhoid, paratyphoid, or dysentery bacilli, but large numbers of encysted Lamblia intestinalis were seen on microscopical examination of the fæces. No entamœbæ were found. On the 21st we tested the agglutination reaction of the patient's serum, in 1 in 50 and 1 in 100 dilutions, against the three known strains of dysentery bacilli—Flexner, "Y," and Shiga—with negative results in all cases.

CASE 2.—The patient, aged 21, went from England to Gallipoli via Alexandria, where he stayed two days, and Lemnos, where he remained for a day and a half. He was in good health, and he landed on "Y" beach on June 15th, 1915. On July 17th the diarrhœa commenced; it was associated with colicky pains in the abdomen, and blood and mucus were passed with every motion. The diarrhœa was severe day and night, so that some nights he even slept at the latrines. He did not report sick until about the end of July. He was given seven injections of emetine, but he states that they did no good whatever, and he was put on light duty. He continued on light duty till Sept. 23rd, when, as there was no improvement in his condition, he was sent direct home. He was very ill while on the ship, the diarrhœa being continuous. He had no further emetine injections. Arriving at Clandon Park Hospital, Guildford, about the beginning of October, he was transferred to the Brook War Hospital on the 18th. The diarrhœa continued while at Clandon, six or seven motions per day, associated with the passage of blood and mucus, and when he was transferred to the Brook Hospital he was passing up to five motions per day. By Jan. 20th, 1916, he was much improved, although passing three motions per day, but there was no blood or mucus. He finds, however, that if he takes any hot food, particularly hot fluid—e.g., tea—it brings on one or two loose motions almost immediately. He has consequently to be careful with his diet. He has had no fever since admission to the Brook Hospital.

The excreta were examined at the Addington Park Laboratory on Dec. 15th, 1915, and found negative. The fæces and urine were sent to us on Jan. 10th, 1916, and, failing to isolate any typhoid, paratyphoid, or dysentery bacilli, we found encysted forms of Lamblia intestinalis in the fæces in considerable numbers, but no Entamœbæ histolyticæ. On the 21st we examined the agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) with the three known dysentery bacilli—Flexner, "Y," and Shiga—and obtained negative results in all cases.

CASE 3.—The patient, aged 25, went from this country to Gallipoli via Alexandria, at which place he was ashore for one day only. Landing at Suvla Bay on August 12th, 1915, he was quite well until about Sept. 25th, when the illness began with loss of appetite, and, shortly thereafter, diarrhœa. At first he had about five motions per day, but about two weeks later the diarrhœa got worse and blood and mucus were habitually passed. He, however, kept on duty until Oct. 21st, and on the 23rd he left the Peninsula for home. The diarrhœa continued all the way home, about four motions per day, frequently with blood and mucus. He was admitted to the Brook War Hospital on Nov. 9th, and he looked ill and was very thin. He gradually improved, and by Jan. 19th, 1916, he was passing only two motions per day, which, however, were loose, but contained neither blood nor mucus. He had some fever during the first week after admission to the Brook Hospital, but none since. He had one injection of emetine in Gallipoli, which had no effect on his condition, but none since. He has been treated with cyllin capsules (m iii.) in Brook Hospital.

The fæces and urine were sent to us for bacteriological examination on Jan. 12th, and we found encysted forms of Lamblia intestinalis in large numbers, but failed to recover any typhoid, paratyphoid, or dysentery bacilli. No entamœbæ were discovered. We tested the agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) on the 21st with the three known dysentery bacilli—Flexner, "Y," and Shiga—with uniformly negative results.

CASE 4.—The patient, aged 31, went from Australia to Egypt (Heliopolis), where he remained two weeks and enjoyed good health. He was transferred to Gallipoli and

[1] THE LANCET, Nov. 27th, 1915, p. 1178.
[2] Brit. Med. Jour., Nov. 13th, 1915.
[3] THE LANCET, Nov. 27th, 1915, p. 1178.

landed at "Anzac" on August 15th, 1915. Diarrhœa commenced on the day after landing. He had five or six motions per day during the first week of illness, and from 20 to 30 motions per day during the second week; blood and mucus were continually passed, and sickness and vomiting were troublesome. Notwithstanding the diarrhœa he kept on duty, with the exception of one day, until about Sept. 14th, when he was sent to Mudros. He was six weeks in hospital in Mudros, the diarrhœa continuing, with passage of blood and mucus most of the time. From Mudros he came direct to England, and was admitted to the Brook War Hospital on Dec. 4th, 1915. His condition greatly improved on the ship, and the diarrhœa stopped shortly after embarkation. During the last fortnight of December he had a recurrence of the diarrhœa, but has remained well since. He received two injections of emetine in Gallipoli and ten injections on the way to Mudros. For three or four days only after the ten injections the diarrhœa was greatly improved, but recurred at Mudros. He has had no further emetine treatment.

The fæces and urine were sent to us for bacteriological examination on Jan. 21st, 1916. We were unable to isolate any typhoid, paratyphoid, or dysentery bacilli, but found considerable numbers of the encysted forms of Lamblia intestinalis in the fæces; no entamœbæ were seen. Agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) with the three known dysentery bacilli—Flexner, "Y," and Shiga—on this date gave negative result throughout.

CASE 5.—The patient, aged 20, went direct from this country to Gallipoli and landed at Suvla Bay about the first week of August, 1915. Three to four weeks after landing diarrhœa commenced, 12 and more motions per day, associated with the passage of blood and mucus; his condition got worse, 20 to 30 motions being passed daily, with sickness and vomiting. After two months' illness he was sent direct to England, arriving at the Brook War Hospital on Nov. 8th, 1915. His condition has slowly improved, but by Jan. 20th, 1916, he was still passing two loose motions per day. He has to be careful with his diet, too; hot fluids tend to start the diarrhœa, and fruit will set it up about two days. There has been no fever since admission to the Brook Hospital. The patient has never had any emetine.

An examination of the excreta by us on Jan. 13th showed the presence of numerous cysts of Lamblia intestinalis in the fæces, but no Entamœbæ histolyticæ, and we did not recover any typhoid, paratyphoid, or dysentery bacilli. A previous examination on Dec. 29th at the Addington Park Laboratory was negative. Agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) with the three known dysentery bacilli—Flexner, "Y," and Shiga—was done on Jan. 21st and found negative.

CASE 6.—The patient, aged 20, arrived at Suvla Bay about the first week of August, 1915, direct from this country. A week after landing diarrhœa began with six or seven motions per day, associated with passage of blood and mucus; the diarrhœa increased in severity, and he had considerable vomiting and pains in the abdomen. He kept on duty, however, for a month longer, when he was sent to a rest camp for five days. There was little or no improvement in his condition, the diarrhœa persisting, with passage of blood and mucus, but nevertheless he resumed duty. His condition got still worse and on Oct. 23rd he was carried from the trenches to the ship and he left direct for England. The diarrhœa continued while on the ship and he arrived at the Brook War Hospital on Nov. 9th. Since admission to hospital he has slowly improved, but by Jan. 19th, 1916, there was still looseness of the bowels, four motions per day, and still occasional abdominal pain. He had considerable fever on the ship, necessitating cold sponging, and for the first ten days after admission to hospital in this country he had moderate fever, but there has been none since. The patient had one emetine injection on the ship and one injection after admission to the Brook Hospital, but none at any other time.

The fæces and urine were sent to us for bacteriological examination on Jan. 14th. We did not recover any typhoid, paratyphoid, or dysentery bacilli, but found numerous encysted forms of Lamblia intestinalis in the fæces and no entamœbæ. The agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) with the three known dysentery bacilli—Flexner, "Y," and Shiga—was done on the 21st and gave negative result in all cases.

CASE 7.—The patient, aged 32, arrived at Alexandria from England and remained there for one month before being transferred to Gallipoli. Landing at "Y" beach, west of Krithia, on April 25th, 1915, he was quite well until about three months later. Diarrhœa set in, with eight or nine motions per day, associated with the passage of blood and mucus and colicky pains in the abdomen. He did not report sick and left the Peninsula with his regiment for four days' rest in camp at Lemnos. The diarrhœa persisted, yet he returned to Gallipoli, where he remained till Sept. 19th. He was compelled to report sick on this date, as the diarrhœa was so bad, from 20 to 30 motions daily, with blood and mucus habitually. He was sent direct to England, and arrived at Clandon Park Hospital in the first week of October, where he remained until the 18th, when he was transferred to the Brook War Hospital. On the ship the diarrhœa was almost continuous, but when in Clandon it had become reduced to three or four motions daily with only a little blood and no mucus. He has had no diarrhœa since admission to the Brook Hospital, but if he drinks anything hot then he has a loose motion almost immediately. There has been no fever since admission to the Brook Hospital. He received an injection of "serum" for his dysentery while on the hospital ship, but is not aware of having had any emetine.

The excreta were examined at the R.A.M.C. Laboratory, Millbank, on Dec. 8th, 1915, and found negative, and again at the Addington Park Laboratory, on the 15th, with similar result. The fæces and urine were sent to us on Jan. 17th, 1916, for bacteriological examination. We did not recover any typhoid, paratyphoid, or dysentery bacilli, but found encysted forms of Lamblia intestinalis in the fæces and no entamœbæ. The agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) with the three known dysentery bacilli—Flexner, "Y," and Shiga—on the 21st gave uniformly negative results.

CASE 8.—The patient, aged 18, went from Australia to Egypt and was stationed at Cairo for nine weeks. After a month in Egypt he had a slight attack of diarrhœa lasting a week, but did not pass blood or mucus, and recovery was complete. Going to Gallipoli, he landed at "Anzac" on August 20th, 1915, and on the 28th he was taken ill with diarrhœa, which gradually got worse. By the end of a week he was passing five motions per day, each containing blood and mucus, and he suffered from headaches and abdominal pains, with much flatulence but no vomiting. He remained on duty till Oct. 23rd, when he was sent back direct to England. The diarrhœa continued while on the ship, although the passage of blood diminished and eventually ceased, but mucus continued to be passed for a long time. He arrived at the Brook War Hospital on Nov. 9th and the diarrhœa ceased two weeks later. He has had no fever since admission to the Brook Hospital, and by Jan. 19th, 1916, he was feeling very fit. He had five injections of emetine while in Gallipoli with practically no effect on the diarrhœa, and has had no emetine since.

On Jan. 17th we made an examination of the fæces and urine, but no typhoid, paratyphoid, or dysentery bacilli were found. Encysted forms of Lamblia intestinalis, however, were present in the fæces in considerable numbers, but no entamœbæ were discovered. On the 21st the patient's serum (1/50 and 1/100 dilutions) gave negative agglutination reaction with the three known dysentery bacilli—Flexner, "Y," and Shiga.

CASE 9.—The patient, aged 23, went from Australia to Cairo for six weeks and enjoyed good health there. From Cairo he arrived at "Anzac" about the middle of May, 1915, and was four months on the Peninsula before being taken ill. Diarrhœa set in, 17 to 20 motions per day, with passage of blood and mucus, but he did not report sick until two weeks later. He was sent to Lemnos, and was in hospital there for two months, the diarrhœa continuing, 12 to 15 motions daily with blood and mucus, associated with sickness and vomiting and abdominal pains. From Lemnos he was sent direct to England, and he improved considerably on the ship. Arriving at the Brook War Hospital on Dec. 5th he was passing about three motions per day. He made further progress, and by Jan. 21st, 1916, was passing only one or two motions per day; these were fairly well formed but still contained a little mucus. There has been no fever since admission to the Brook Hospital. The patient received six injections of emetine at Lemnos and one injection on the ship, but with little effect on the diarrhœa; two injections of emetine were also given shortly after admission to the Brook Hospital.

On Jan. 19th we examined the fæces and urine and failed to find any typhoid, paratyphoid, or dysentery bacilli. Microscopical examination of the fæces showed numerous encysted forms of Lamblia intestinalis but no entamœbæ. On the 21st we tested the agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) with the three known dysentery bacilli—Flexner, "Y," and Shiga—and found it negative in all cases.

CASE 10.—Going direct from England to Gallipoli the patient, aged 23, landed at "Anzac" about the second week of September, 1915. Three weeks after landing diarrhœa started, 12 to 14 motions per day, with passage of blood and mucus. After two weeks' illness he was sent direct back to England, and arrived at the Brook War Hospital on Nov. 8th. On the ship he was having about eight motions per day, with blood and mucus present, but two weeks after arrival in this country the diarrhœa greatly improved. By Jan. 21st, 1916, he was passing only two loose motions per day, and no blood had been passed for nearly a month previously. Since

admission to the Brook Hospital there has always been a tendency to a subfebrile temperature, and by Jan. 21st the patient did not feel too strong, and hot drinks—e.g., tea—had a tendency to start the diarrhœa which would last for a day. The patient states that he never had any emetine.

The excreta were examined at the Addington Park Laboratory on Dec. 29th and found negative. On examination of the fæces and urine on Jan. 19th we failed to isolate any typhoid, paratyphoid, or dysentery bacilli, but numerous encysted forms of Lamblia intestinalis were found on microscopical examination of the fæces; no entamœbæ were found. The patient's serum (1/50 and 1/100 dilutions) examined by us on the 21st gave negative agglutination reaction with the three known dysentery bacilli—Flexner, "Y," and Shiga.

CASE 11.—The patient, aged 21, went direct from England to Suvla Bay, landing about August 8th, 1915. On Oct. 18th he was seized with diarrhœa, which was almost continuous day and night, and was accompanied by the passage of blood and mucus. He also suffered from headaches and abdominal pains. A week after the onset he was sent direct to England, arriving at the Brook War Hospital on Nov. 9th. The diarrhœa persisted on the ship and was present on arrival in this country, and only lessened about Christmas time. He gradually improved and by Jan. 21st, 1916, was passing only one or two motions daily and no blood or mucus. If he takes anything hot, however, then he has one or two loose motions shortly thereafter. He has had no fever since admission to the Brook Hospital. He states that he received five hypodermic injections (probably emetine) on the ship, but none since.

The fæces and urine were examined by us on Jan. 20th, but no typhoid, paratyphoid, or dysentery bacilli were isolated. Encysted forms of Lamblia intestinalis, however, were found in large numbers in the fæces, but no entamœbæ. On the 21st the agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) with the three known dysentery bacilli—Flexner, "Y," and Shiga—was found negative.

CASE 12.—From England the patient, aged 27, went direct to Mudros. After four days there, during which time he was quite well, he sailed for Gallipoli, and landed at "Gully" beach in September, 1915. Seven weeks after landing the dysentery started. It was of a severe type, almost continuous diarrhœa with passage of blood and mucus; yet he remained on duty for two weeks longer before reporting sick. After three days at a dressing station on the Peninsula he was sent direct to Alexandria. After arrival in Alexandria he remained in hospital there for six weeks before embarking for England; he was very ill with considerable fever and dilirium. The diarrhœa, however, improved towards the end of his residence there and before he left he was passing about two motions per day. Two weeks before leaving Egypt his condition was complicated by the development of neuritis in both legs. Coming to this country he arrived in the Brook War Hospital on Dec. 4th. Apart from the incapacity consequent upon the neuritis he was fairly well, passing one or two motions per day with no blood or mucus. During the third week, and again at the end of the fourth week after admission to the Brook Hospital, his temperature showed a subfebrile tendency. The patient had in all 36 injections of emetine—16 on the ship going to Alexandria and 20 in Alexandria. He states that he might possibly have been free from diarrhœa for about half a day after each injection but otherwise he thinks it had little effect.

On examination of the fæces and urine on Jan. 14th, 1916, we were unable to recover any typhoid, paratyphoid, or dysentery bacilli, but microscopical examination of the fæces showed numerous encysted forms of Lamblia intestinalis. No entamœbæ were found. On Jan. 25th we tested the agglutination reaction of the patient's serum (1/50 and 1/100 dilutions) with the three known strains of dysentery bacilli—Flexner, "Y," and Shiga—and found a negative result in all cases.

Reviewing this series of cases we find several features worthy of note. All the cases presented a dysenteric type of diarrhœa, with passage of blood and mucus of a considerable degree of severity, and usually associated with abdominal pains. Infection occurred on the Peninsula at varying intervals of time, from one day to six months after landing. Several of the men, although suffering severely from the diarrhœa, kept on duty for one or two months before going off sick.

The long duration of the condition is another point worthy of special mention. The acute symptoms - diarrhœa with blood and mucus—varied from about one month to nearly six months. Four cases had acute symptoms from one month to a month and a half, and 6 cases from two to two and a half months.

The tendency of all the cases to show spontaneous improvement only upon change to a cooler climate is another remarkable feature. Three of the cases showed improvement on board the hospital ship conveying them to this country, one improved in hospital in Alexandria, but the remainder only made undoubted progress after landing in England.

Encysted forms of Lamblia intestinalis were found in the fæces at intervals varying from about three to six months after the onset of infection, and they were present in large numbers. No active forms were met with, but it must be remembered that we did not have the opportunity of examining a diarrhœic motion.

In 9 of the cases emetine was given hypodermically with little or no effect on the condition, and this in itself rather suggests some other cause for the diarrhœa than entamœba histolytica. Further, in none of the cases did we find any entamœbæ histolyticæ in the fæces. We failed to recover any typhoid, paratyphoid, or dysentery bacilli from the excreta of any case, and in no case did the patient's serum agglutinate known dysentery bacilli, the three strains Flexner, "Y," and Shiga being used against the serum diluted 1 in 50 and 1 in 100.

All the patients had previously been inoculated against enteric fever.

The problem presenting itself is that of the pathogenicity of Lamblia intestinalis. We do not propose to make any dogmatic statement on the subject; under the circumstances such is not possible, and we content ourselves simply by placing the facts of the cases on record. The question whether there may not have been a primary amœbic dysentery with lamblia infection superadded is one that we are not in a position to answer with certainty. Such a double infection would be quite in accord with the apparent failure of the emetine treatment. Bacteriological examination of the cases both in the earlier and later stages of the illness would probably settle this point, and so for the present we must await the publication of reports from those investigators who have had the opportunity of so examining them. A possible primary infection with bacillary dysentery is not likely, since no positive agglutination was got with any of the patients' sera and known dysentery bacilli.

The length of time during which the encysted forms of Lamblia intestinalis were excreted is a very important point, for if the organism be pathogenic, then the question of dealing with carriers will naturally come up for solution. That they are by no means uncommon is shown by the frequency in our series—12 cases out of a consecutive series of 136 so-called dysenteries, which is approximately 9 per cent.

Stitt recognises the prevalence of this infection in the tropics, and holds that it is only less important than that of amœbic dysentery.

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REMARKS ON

# THE NATURE AND DISTRIBUTION OF THE PARASITES OBSERVED IN THE STOOLS OF 1305 DYSENTERIC PATIENTS.

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DURING the period Jan. 21st to April 18th, 1916, I have been able to take an active share in and to supervise the examination of about 3800 stools coming from 1305 British soldiers in various hospitals in the Western Command. The distribution of the parasites is not without interest, and a short account of the results obtained is now given. Most of the patients were relatively convalescent, having previously contracted dysentery chiefly in Gallipoli. A few cases came from the Western front in Flanders. The parasites found were chiefly protozoa and Blastocystis enterocola. The essential features of many of the organisms were described by Fantham and Porter[1] in 1915. A few eggs and embryos of helminthes occurred. Bacteria were not investigated. The parasites observed in fresh preparations are listed in the

[1] Fantham, H. B. and Porter, A. (1915): Notes on Certain Protozoa which may be Found in Cases of Dysentery from the Mediterranean War Zone, Proc. Cambr. Philosoph. Soc., vol. xviii., pp. 184-188.

following table, which also shows their differential distribution:—

| | | | |
|---|---|---|---|
| No. of patients | | | 1291 |
| ,, ,, | in whom parasites were found | | 446 |
| Total number of examinations made | | | 3325 |
| No. of examinations in which | Entamœba histolytica occurred | | 38 |
| ,, ,, | Entamœba coli | ,, | 211 |
| ,, ,, | Noc's entamœba | ,, | 2 |
| ,, ,, | Amœba (Vahlkampfia) limax occurred | | 2 |
| ,, ,, | Giardia (Lamblia) intestinalis | ,, | 471 |
| ,, ,, | Trichomonas hominis | ,, | 2 |
| ,, ,, | Chilomastix (Tetramitus) mesnili occurred | | 1 |
| ,, ,, | Cercomonas parva occurred | | 2 |
| ,, ,, | Coccidia (apparently Isospora type) occurred | | 4 |
| ,, ,, | Spirochætes occurred | | 42 |
| ,, ,, | Blastocystis enterocola occurred | | 198 |
| ,, ,, | Tænia embryos | ,, | 1 |
| ,, ,, | Hymenolepis embryos | ,, | 1 |
| ,, ,, | Trichocephalus eggs | ,, | 3 |

The proportion of examinations positive for E. histolytica is somewhat low on account of the relatively large number of injections of emetine received by the men before reaching England, some patients having had as many as 40 injections. It will also be seen that the high proportion of examinations showing lamblia is evidence that injections of emetine have apparently little action on these flagellates, many of the lamblia cases having been previously treated with the drug. Administration of emetine by the mouth might perhaps be more efficacious in some cases. The proportion of stools showing spirochætes, of the type S. eurygyrata, Werner emend. Fantham, is really much higher than appears in the table, as was found by making stained preparations of some of the stools and by using dark-ground illumination. It is of interest to note that at least one case of lamblial diarrhœa and one case of amœbic dysentery were found among soldiers who had only been on the Western front in Flanders and had never been to the tropics.

A summary of the combinations of the parasites constituting the various infections in the 446 positive cases is now given.

The single infections were 325 in number, and were distributed thus:—E. histolytica occurred in 7 cases; E. coli in 81; Giardia (Lamblia) intestinalis in 137; spirochætes (S. eurygyrata) in 23; Blastocystis enterocola in 72; Amœba (Vahlkampfia) limax in 2; Trichocephalus dispar in 2; and Tænia saginata in 1.

The double infections were 79 in number, being distributed as follows: E. histolytica and E. coli occurred together in 5 cases; E. histolytica and lamblia in 3; E. coli and lamblia in 21; E coli and spirochætes in 3; E. coli and blastocystis in 20; E. coli and hymenolepis embryos in 1; Noc's entamœba and blastocystis in 1; lamblia and spirochætes in 1; lamblia and blastocystis in 15; lamblia and trichomonas in 1; lamblia and coccidia (isospora) in 2; spirochætes and blastocystis in 4; blastocystis and chilomastix (tetramitus) in 1; and blastocystis and trichocephalus eggs in 1.

The triple infections were 33 in number and were distributed thus: E. histolytica, E. coli, and lamblia occurred together in 2 cases; E. histolytica, E. coli, and blastocystis in 2; E. histolytica, lamblia, and spirochætes in 1; E. histolytica, lamblia, and blastocystis in 1; E. coli, lamblia, and spirochætes in 2; E. coli, lamblia, and blastocystis in 18; E. coli, spirochætes, and blastocystis in 2; E. coli, lamblia, and cercomonas in 1; E. coli, blastocystis, and trichomonas in 1; E. coli, lamblia, and coccidia (isospora) in 1; and lamblia, spirochætes, and blastocystis in 2.

The quadruple infections were 7 in number and were distributed as follows: E. histolytica, E. coli, lamblia, and blastocystis occurred together in 4 cases; E. coli, lamblia, spirochætes, and blastocystis in 1; E. coli, lamblia, blastocystis, and coccidia (isospora) in 1; and lamblia, spirochætes, blastocystis, and cercomonas in 1.

The quintuple infections were 2 in number, thus: E. histolytica, E. coli, lamblia, spirochætes, and blastocystis were found together in 2 patients.

In addition to the above records, 499 examinations were made personally by me of 14 special cases in the School of Tropical Medicine Auxiliary Military Hospital, Liverpool. The patients, who were all parasitised, were examined daily while in hospital. The differential findings were as follows:—

| | | | |
|---|---|---|---|
| No. of special cases, all of them parasitised | | | 14 |
| Total number of special examinations | | | 499 |
| No. of occasions on which | Entamœba histolytica was found | | 27 |
| ,, ,, | Entamœba coli | ,, | 45 |
| ,, ,, | Giardia (Lamblia) intestinalis | ,, | 348 |
| ,, ,, | Trichomonas hominis | ,, | 1 |
| ,, ,, | Chilomastix (Tetramitus) mesnili | ,, | 7 |
| ,, ,, | Cercomonas parva | ,, | 3 |
| ,, ,, | Spirochætes (S. eurygyrata) | ,, | 36 |
| ,, ,, | Blastocystis enterocola | ,, | 22 |

Most of these 14 special cases were examined more particularly for lamblia, and in the next instance for entamœbæ. Double, triple, and other multiple infections were found in some of the stools. Thus, one patient, when first examined by me, showed Giardia (Lamblia) intestinalis and E. coli. Soon spirochætes, S. eurygyrata, and blastocystis were seen in his fæces, and later E. histolytica was found therein. The periodicity in the appearance of these various parasites was not the same. In this case the lamblia decreased and disappeared for 13 days, then reappearing in sparse numbers. The spirochætes behaved in a somewhat similar manner, but with a shorter period. Tetramitus was also seen in the patient. This example of multiple infection, however, was somewhat exceptional, for in some of the cases studied the only protista present were lamblia.

Details as to the various infections in the special cases may now be set forth. Single infections of lamblia occurred in 2 cases. Double infection of lamblia with E. coli occurred in 2 cases. Each of the remaining cases presented a different combination of parasites. Thus, the remaining combinations were: Lamblia and chilomastix (tetramitus); lamblia and blastocystis; lamblia, E. histolytica, and E. coli; lamblia, E. coli, and spirochætes; lamblia, E. coli, and blastocystis; lamblia, E. coli, and cercomonas; lamblia, cercomonas, and blastocystis; lamblia, E. histolytica, E. coli, and spirochætes; E. histolytica, E. coli, trichomonas, tetramitus, spirochætes, and blastocystis; and lamblia, E. histolytica, E. coli, spirochætes, blastocystis, tetramitus, and cercomonas.

In view of the difficulty of eliminating parasitic protozoa from the human alimentary tract by drugs or other means, and of the recognised occurrence of parasite carriers, these figures are not without interest and significance.

I have pleasure in thanking Captain E. E. Glynn, R.A.M.C. (T.F.), pathologist, Western Command, for much material, and Professor J. W. W. Stephens, and Captain L. A. Morgan, R.A.M.C. (T.F.), for facilities in obtaining specimens from the special cases studied at the Tropical School Hospital. I would especially thank Mr. W. Riddell, M.A., Mr. H. F. Carter, and Miss M. Pallis for help in the routine examinations, and Dr. E. C. Lowe, of Southport, and Dr. A. L. Robinson for material.

## AN ENUMERATIVE STUDY OF THE CYSTS OF GIARDIA (LAMBLIA) INTESTINALIS IN HUMAN DYSENTERIC FÆCES.

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SINCE the beginning of February, up to April 21st, 1916, I have been able to make a numerical study of the cysts of Giardia (Lamblia) intestinalis, found in the stools of certain soldiers who were patients in the School of Tropical Medicine Auxiliary Military Hospital, Liverpool. The numbers of cysts present, each derived from a flagellate organism provided with a sucking disc whereby it abstracts nourishment from the intestinal epithelial cells, are not without significance when the pathogenicity of lamblia is under consideration.

The general morphology of lamblia has been described by different workers on various occasions. The essential features thereof were described by Fantham and Porter[1] in 1915, and the subject will not be further discussed here. The evidence relating to the pathogenicity of lamblia was also given in the same paper.

[1] Notes on Certain Protozoa which may be Found in Cases of Dysentery from the Mediterranean War Zone, Proc. Camb. Philosoph. Soc., vol. xviii., pp. 184-188.

### *Material and Methods.*

This investigation was conducted during the months of February, March, and April, 1916. A daily personal visit was made to the hospital and a moderately large sample of the stool of each patient under investigation was taken. Each sample was treated in the following manner. Half a cubic centimetre of sterile normal salt solution was poured into a finely graduated measuring cylinder, and to this fæces was added in tiny portions from different parts of the sample, until the level of the salt solution was at the one cubic centimetre mark. Thus an exact volume—namely, half a cubic centimetre—of fæces was measured on each occasion. This was further diluted with sterile normal saline solution and was thoroughly emulsified, the dilution being continued until an emulsion sufficiently thin for microscopical examination was obtained. The dilution varied with the consistency of the stool, dilutions of 10, 20, 40, and occasionally 80 being employed. A drop of the emulsion was placed in the chamber of a Thoma-Zeiss hæmocytometer, precautions similar to those used in making blood counts being observed. Usually the counting chamber was filled four times over for each estimation, great care being taken to ensure that the emulsion was as perfect as possible before the sample drop was taken. The number of cysts in a cubic millimetre of the stool examined could thus be estimated. One-half cubic centimetre of stool was employed for dilution, whether the stool were formed, semi-formed, or diarrhœic in character.

The volume of certain of the stools of different patients was determined in cubic centimetres on some occasions. The significance of this, in relation to the probable number of cysts in the whole of an infected stool, is considered later.

It was not possible to retain some of the patients in hospital for as long a time as was desirable from the point of view of extended enumerations. However, certain deductions can be made already from my work, and these will now be indicated.

### *Cases Studied.*

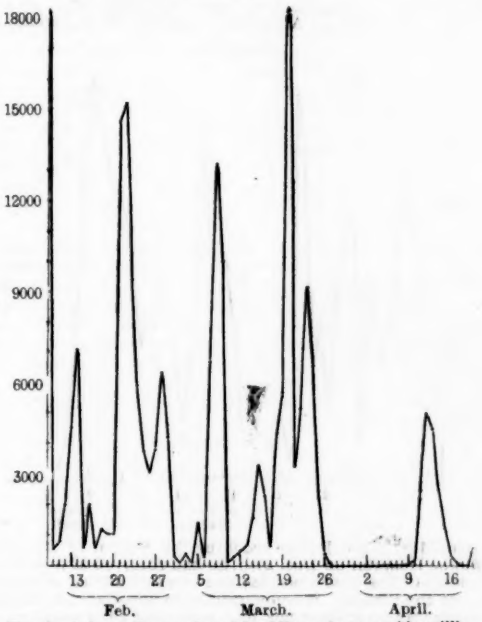
A few general statements may be made in connexion with the cases studied. Some of the patients were relatively convalescent when they came under observation. All of them showed weakness, especially after exertion. With regard to the temperature charts, in the cases of lambliasis there has been little noticeable during the time that I have been able to conduct observations. Occasionally the temperature was slightly subnormal. One patient (Case 1) was in a weak condition when admitted and has remained so from the time he was first under observation up to the present. No parasite other than lamblia has been found in him, and the case is regarded as one of pure lambliasis. This patient, who contracted lambliasis in Flanders, had a stool that was almost always bulky and diarrhœic in character. Its colour and consistency also were peculiar, having been compared with khaki, mud, whipped cream, and putty. Many of the lamblia-infected stools were sulphur-yellow in colour, but in some cases the colour was hardly different from that of normal stools. At times most of the men were somewhat constipated.

Most of the lambliasis patients had received a number of injections of emetine before they reached England. From the time that they came under observation no Entamœba histolytica was found in their stools, and E. coli and blastocystis occurred only very occasionally in some of them. Spirochætes were not observed. The emetine injections seemed to have had little action on the lamblia.

The statements relating to each of the cases studied may now be set forth, but it is not always possible to give details of the earlier history of some of the men.

CASE 1.—This case was of special interest, since the patient had never been out of England before he proceeded to Flanders, where he only stayed two months, and where he contracted lamblial diarrhœa of a severe type on Dec. 18th, 1915. He was invalided and sent to England. During the acute stage of the illness he passed 17 motions daily. No emetine was given. On reaching England he was in hospital in the Thames Valley, and then had a short furlough, after which he was sent to the School of Tropical Medicine Auxiliary Military Hospital from his depôt on Jan. 21st, 1916. He was then passing 14 motions per day, but there was a rapid decrease after treatment with pulv. cret. arom. on Jan. 24th to five and four motions per day, and since April 6th there have been three or four motions daily. On Feb. 15th some blood was passed with the stool. On the 19th β naphthol was given, but it produced vomiting. On the 25th much blood was present in the motion. The bacteriological examination of this blood and of the stool was negative for dysentery-producing bacilli on this and on subsequent occasions, but many lamblia cysts were present. Much blood was also passed on the 27th, 28th, and 29th, and on March 1st. On Feb. 28th mist. terebinthinæ was given and was stopped on March 1st, while on March 2nd and 3rd β naphthol was administered, but produced vomiting. On the 8th mist. terebinthinæ was given again, and on the 15th

CHART 1.




The chart shows the number of lamblia cysts per cubic millimetre from day to day in Case 1.

salol was given. On the 24th treatment with bismuth salicylate three times daily was tried, a level teaspoonful being the dose. The lamblia cysts gradually disappeared under this treatment, which was discontinued on April 5th. The cysts then began to reappear. On the 14th treatment with bismuth subnitrate in 10-grain doses three times daily was begun. The cysts decreased in numbers, but had not entirely disappeared from the stool on the 17th; then followed two days negative, and on the next day the cysts returned, showing that the dose of bismuth subnitrate was hardly large enough.

The daily enumerations in this case were as follows:—

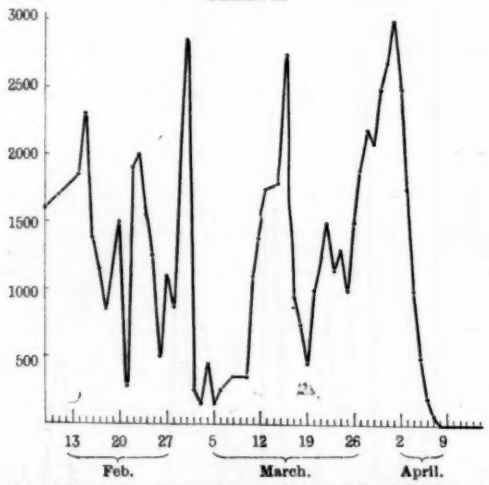
| Date. | Lamblia cysts per c.mm. of fæces. | Date. | Lamblia cysts per c.mm. of fæces. |
|---|---|---|---|
| Feb. 9 | 18,200 | March 10 | 150 |
| ,, 10 | 550 | ,, 11 | 300 |
| ,, 11 | 800 | ,, 12 | 500 |
| ,, 12 | 2,000 | ,, 13 | 700 |
| ,, 13 | 4,500 | ,, 14 | 1,600 |
| ,, 14 | 7,050 | ,, 15 | 3,300 |
| ,, 15 | 600 | ,, 16 | 2,300 |
| ,, 16 | 2,000 | ,, 17 | 650 |
| ,, 17 | 600 | ,, 18 | 4,350 |
| ,, 18 | 1,200 | ,, 19 | 5,700 |
| ,, 19 | 1,050 | ,, 20 | 25,400 |
| ,, 20 | 1,050 | ,, 21 | 3,300 |
| ,, 21 | 14,600 | ,, 22 | 5,150 |
| ,, 22 | 15,200 | ,, 23 | 9,150 |
| ,, 23 | 9,400 | ,, 24 | 6,550 |
| ,, 24 | 5,900 | ,, 25 | 2,250 |
| ,, 25 | 3,750 | ,, 26 | 400 |
| ,, 26 | 3,100 | Mar. 27 to Apr. 8 | ...Negative. |
| ,, 27 | 3,800 | April 9 | 50 |
| ,, 28 | 6,300 | ,, 10 | 200 |
| ,, 29 | 4,200 | ,, 11 | 2,500 |
| March 1 | 300 | ,, 12 | 5,000 |
| ,, 2 | 150 | ,, 13 | 4,500 |
| ,, 3 | 400 | ,, 14 | 2,500 |
| ,, 4 | 150 | ,, 15 | 1,250 |
| ,, 5 | 1,400 | ,, 16 | 375 |
| ,, 6 | 300 | ,, 17 | 100 |
| ,, 7 | 6,650 | ,, 18 | ...Negative. |
| ,, 8 | 13,200 | ,, 19 | ,, |
| ,, 9 | 10,000 | ,, 20 | 600 |

The graphical representation of the foregoing results is shown in Chart 1. Owing to limitations of space, in Cases 2 to 7 the graph alone is given.

Case 1 shows that Giardia (Lamblia) intestinalis is, to say the least, not without pathogenic significance, as it is the only organism that has been found in the patient that can in any way bear a causal relation to the diarrhœa from which he suffered.

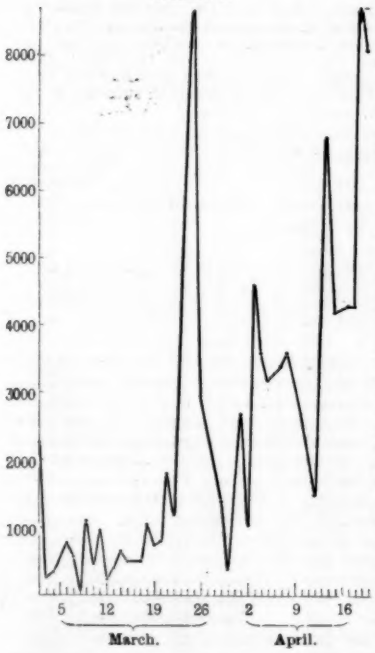
CASE 2.—This patient contracted dysentery when at the Dardanelles, and has been ill since Oct. 15th, 1915. At first he was in hospital at Alexandria, whence he was invalided

CHART 2.




on Dec. 14th, 1915. Before reaching the School of Tropical Medicine Hospital on Dec. 24th, he had received 22 injections of emetine. Ten stools per day were passed during the acute stage of the illness. When admitted to hospital the number of stools was up to four per day, and since then usually two or three motions have been passed daily. As with several of the other cases of lambliasis, constipated periods have occurred, and it has been necessary to have recourse to aperients. On April 5th, 1916, treatment by the administration of a teaspoonful of bismuth salicylate three times daily was commenced. The cysts had disappeared from the stools by April 8, and have not since reappeared during treatment. (See Chart 2.)

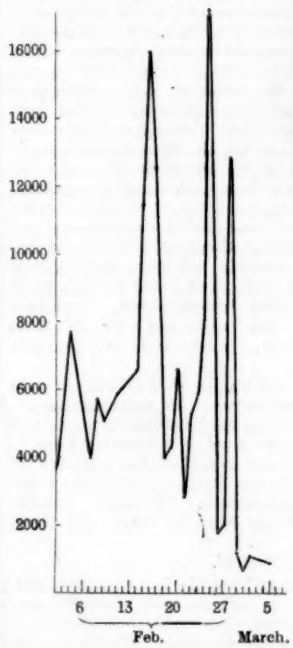
CHART 3.




CASE 3.—This patient from the Dardanelles had contracted dysentery on Oct. 26th, 1915. He was first sent to hospital in Malta, and was invalided to England on Jan. 25th, 1916. Twelve to 15 motions per day were passed during the acute stage of the malady. Prior to reaching the School of Tropical Medicine Hospital he had received 12 injections of emetine. When admitted on Feb. 10th one motion was passed daily, but since then two or three, or occasionally one, have been voided. Constipated periods have occurred when aperients had to be given. (See Chart 3.)

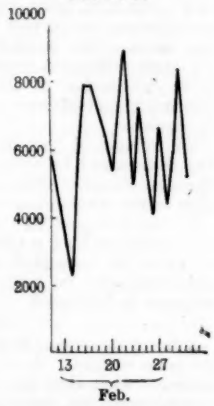
CASE 4.—This patient contracted dysentery when at Alexandria. No protozoal infections were then found in the stools. On admission to the School of Tropical Medicine Hospital on Dec. 7th, 1915, he passed one to two motions daily. No mucus was present in the stools. The early treatment of the patient from Dec. 22nd was by pulv. cret. arom. On Feb. 15th, 1916, β naphthol was administered three times daily. This was continued until the 23rd. On the 26th mist. terebinthinæ was ordered and a decrease in the number of lamblia cysts ultimately occurred, though the patient was not free from lamblia when discharged. (See Chart 4.)

CHART 4.



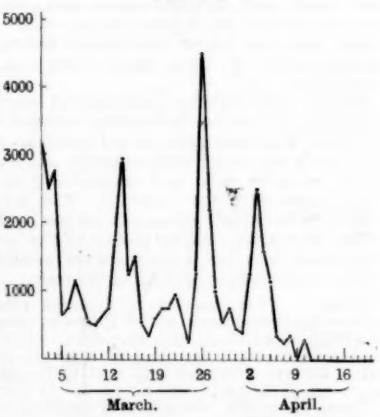

CASE 5.—This patient came from the Dardanelles, where he had contracted dysentery about Oct. 15th, 1915. During the acute stage of the malady 16 stools were passed daily. He received 15 injections of emetine before reaching England, whither he was invalided on Oct. 24th. When his stools were examined at the School of Tropical Medicine Hospital in February, 1916, no entamœbæ were found, but an abundance of lamblia cysts was present. No special treatment was administered in this case, and the patient was still infected when discharged, but the parasites were decreasing in numbers. (See Chart 5.)

CHART 5.




CASE 6.—This patient, when at the Dardanelles, became infected with dysentery on Nov. 14th, 1915. He was sent to Mudros and thence to England. He received four injections of emetine prior to entering hospital at Liverpool, but no entamœbæ were found when a stool was examined, though many lamblia cysts were present. One or two motions were passed daily at first, but the number increased to two or three. Treatment with bismuth salicylate, one teaspoonful three times daily, was ordered on April 4th, 1916. On the 6th, after the bismuth treatment had begun, the cysts decreased in number, and from the 11th to the time of writing have not reappeared. (See Chart 6.)

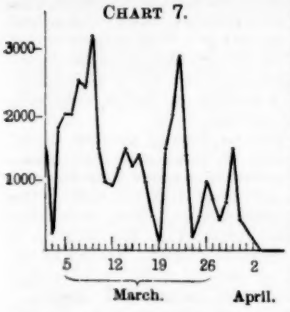
CHART 6.




CASE 7.—This patient had contracted dysentery on Dec. 7th, 1915, when in Gallipoli, and was sent to Malta. He was invalided thence on Jan 25th, 1916, and was admitted

to the School of Tropical Medicine Hospital on Feb. 2nd, 1916. During the acute period of the disease nine motions were passed daily. Before reaching England he had received two injections of emetine. On admission one or two stools were passed daily, and they were almost always bulky and hard in character. On March 29th treatment with bismuth subnitrate, one teaspoonful three times daily, was ordered. The lamblia cysts decreased in numbers, and had disappeared on April 3rd, after which the man was discharged. (See Chart 7.)

CHART 7.




*The Volume of Lamblia-infected Stools and the Possible Number of Parasites Therein.*

The daily examination of this series of stools has led to the conclusion that probably there is a greater uniformity of distribution of lamblia cysts in a diarrhœic stool than in a formed or hard one. The distribution of cysts in different parts of a stool, however, varies to some extent, but attempts were made to allow for this in the taking of the sample and in the making of the emulsion. As a rule, there appeared to be more parasites in a diarrhœic stool than in one of firmer consistency.

Determinations were made of the volume in cubic centimetres of some of the stools of patients infected with lambliasis. The diet in Cases 1 and 2 at first was milk and fish. Later a chicken diet was prescribed. The remaining five patients were given an ordinary mixed diet. It was found that the volume or bulk of a normal stool from a man fed on a mixed diet varied from 130 to 180 c.c. per day. Pathological stools may vary in volume from about 500 to 1200 c.c. One of the patients observed (Case 1), who is an example of pure lambliasis, had bulky stools varying from 175 to 500 c.c., volumes near the latter figure being the more common. On a few occasions the volume of this patient's stool has reached 950 c.c. Another patient (Case 2) at first had stools that were about normal in volume, averaging 150 c.c., but latterly they have been smaller, averaging 50 c.c. In yet a third patient (Case 3) the bulk of the stool was often 180 to 200 c.c., but latterly the volume has fallen to an average of 125 c.c. The possible number of cysts in a bulky infected stool, such as that of Case 1 on Feb. 22nd, when the volume was 950 c.c. and the number of lamblia cysts per c.mm. was 15,200, is:

$$15{,}200 \times 1000 \times 950 = 14{,}440{,}000{,}000.$$

The possible number of cysts in an infected stool of average volume, such as that of Case 3 on a day of moderate infection—for example, on March 21st, when the volume was 180 c.c. and 1800 lamblia cysts were found in 1 c.mm., is:

$$1800 \times 1000 \times 180 = 324{,}000{,}000.$$

The possible number of lamblia cysts in an infected stool of small bulk on a day when the infection is relatively low, such as that of Case 2 on April 6th, when the volume was 50 c.c. and the number of lamblia cysts per c.mm. was 200, is:

$$200 \times 1000 \times 50 = 10{,}000{,}000.$$

The above examples are sufficient to indicate that the number of lamblia cysts contained in an infected stool is counted in millions, and that every endeavour should be made to reduce and, as far as possible, to eliminate the organisms.

*General Observations.*

Certain points of general interest may now be mentioned. Examination of a large number of stools has shown that uniformity of distribution of lamblia cysts in a diarrhœic stool is more probable than in a formed or hard one. In general there are not so many parasites in a formed stool as in a diarrhœic one. The motions of some of the cases of lambliasis were constipated at times.

Relapses of cases of lambliasis may occur. Also, certain workers have considered that lamblia is harmless and have given no treatment for it. In other cases men known to be heavily infected with lamblia cysts, but free from dysentery-producing bacilli, have been discharged from hospital. Both these classes of men may act as reservoirs of lamblia, and the infective cysts of the parasite may be shed promiscuously through the land, especially in country districts where sanitary arrangements may be somewhat primitive. There is, then, danger of outbreaks of lamblial diarrhœa, especially among infants and younger children. Outbreaks of flagellate diarrhœa have in the past been reported in certain parts of South America and in Italy. Also cases of lambliasis have been recorded by several French workers from investigations conducted by them in Tonkin and other parts of Indo-China, and the infestation of the patients' houses by rats and mice has been noted. This observation is not without interest, as such rodents harbour species of lamblia in their intestines.

The danger arising from the presence of apparently healthy carriers of amœbic dysentery in a community is now well recognised. It is a matter of regret that seemingly so little consideration has been given to the problem of the carriers of lamblia cysts, who may be a source of considerable trouble in the future.

From Charts 1 to 7 it will be seen that the numerical distribution of lamblia cysts in a patient's stools varies from day to day. Cysts result from the rounding of the pear-shaped, suctorial flagellate forms. The cysts themselves are very difficult to eliminate and destroy by means of drugs. Every effort, therefore, should be made to attack the flagellate forms of lamblia—that is, the precursors of the cysts. Probably when cysts are few in the stool of a person suffering from lambliasis, there are numerous flagellates in the duodenum and other parts of the intestine of the patient, and it would be well to try medicaments at such periods. Thus, it might be hoped that the flagellate organisms would be killed before they encysted, and the formation of a new "crop" of cysts be thereby prevented.

Again, from a study of the charts it will be seen that casual examinations of stools made at irregular intervals will result in a fallacious impression being obtained. It is necessary that regular examinations should be conducted, and should be continued over several months if possible.

The periodicity in the appearance of the maximum number of lamblia cysts appears to vary in the different cases. In some of the cases there seems to be a period of about a fortnight between the maximal crops of cysts (see Charts 1, 2, 6, 7), while in other cases it is somewhat less. By daily examinations of the stools of two other (uncharted) cases of lambliasis, periods of 14 and of 10 days were found.

In conclusion, I have pleasure in thanking Professor J. W. W. Stephens, Captain L. A. Morgan, R.A.M.C. (T.F.), and Captain E. E. Glynn, R.A.M.C. (T.F.), for affording me facilities for obtaining material at the School of Tropical Medicine Auxiliary Hospital, Liverpool, and the sisters at the hospital for their cordial coöperation in securing the retention of the patients' stools needed for examination.

# SPINAL ANÆSTHESIA:

## WITH REFERENCE TO ITS USE IN THE TRENDELENBURG POSITION AND FOR THE PREVENTION OF SHOCK.

BY H. M. PAGE, F.R.C.S. ENG.,

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*With a Note by* HAROLD CHAPPLE, M.C. Cantab., F.R.C.S. Eng., *Obstetric Surgeon to Guy's Hospital, &c.*

FOR all ordinary uncomplicated cases inhalation anæsthesia as improved at the present day is still the method of choice. Ether, if not contra-indicated, after a preliminary injection of atropine with or without opium, is rightly preferred, given by means of Clover's apparatus, with the addition, if possible, of oxygen, or by the open method, when a warmed vapour should be blown to the patient if the administration is anything more than a short one, which warming can be very simply effected by coiling an extra long delivery tube in a small receptacle for hot water or by the use of a thermos flask, as in the apparatus designed by my colleague, Dr. F. E. Shipway. There are also special cases where ether is best given by the intratracheal method, by Crile's tubes, or the rectum. Warmed nitrous oxide and oxygen with or without the addition of some ether vapour may be the method to choose, if available. There is also the intravenous route, which may have advantages under certain circumstances, though there are few cases that,

in my opinion, cannot be better managed with one or other of the above-mentioned methods of using ether in conjunction with subcutaneous or, if necessary, intravenous administration of saline or glucose solution. Chloroform is required for some cases, and in the form of A.C.E. or C.E. mixture is of great use for induction. When it is advisable to use chloroform all through the administration, I consider that the percentage method, with the addition of a small quantity of oxygen, is the best method to employ.

There remain, however, many cases in which those who are familiar with its use will agree that great advantages can be obtained by the use of spinal anæsthesia. By this means either the whole or the greater part of the operative shock is done away with. (No form of general anæsthesia can prevent shock.) A more complete muscular relaxation is produced than by any other method of anæsthesia, thereby assisting the surgeon in his work, shortening the time of operative interference, and diminishing traumatism. The operations in which these advantages may be of special importance are those for acute abdominal conditions, especially if septic in nature; any prolonged abdominal procedure likely to be followed by shock; amputations; operations on the bones of the lower limbs, especially when the patient's vitality is lowered by exhaustion, sepsis, or hæmorrhage; and certain genito-urinary operations. At the present time there are many cases of injury to the bones of the lower limbs requiring plates, &c. Spinal anæsthesia is an immense help to the surgeon in all these cases owing to the complete muscular relaxation obtained, and in some will save life by preventing the very great shock often met with in difficult cases of fractured femur.

With regard to the risk of sepsis in spinal injection, a small amount of sterilised fluid sealed in a glass capsule is used, and the operation of injecting it within the theca after taking all ordinary aseptic precautions should be done without touching any part of the needle that comes in contact with the thecal membrane or the solution to be injected.

Though the position of spinal anæsthesia in surgery is now more or less generally accepted, and though there are many surgeons and gynæcologists who are familiar with the use of spinal injections with the Trendelenburg position, the fact that it can be used safely in this position is not generally recognised. Mr. Harold Chapple asked me to try spinal anæsthesia in connexion with the Trendelenburg position four years ago for certain selected pelvic operations. I have therefore ventured to report 70 cases in which the patient was put into the Trendelenburg position after intrathecal injection. I could have reported many more cases in which the patient was put in a slight incline with the head lower than the body without any trouble occurring, but I have only included here those put into the Trendelenburg position. When this position is used it is better to combine a general anæsthetic with the spinal injection, for the small quantity of ether or chloroform mixture required to keep the patient unconscious when there is no reflex disturbance has no necrotic effect on the tissues and practically has very little effect on the after-condition of the patient. If nitrous oxide and oxygen be used there is no effect at all in this respect. The administration of nitrous oxide and oxygen for prolonged periods is quite easy after either a spinal injection or in conjunction with satisfactory local infiltration with novocaine, as recommended by Crile. In this way mental shock and distress are prevented and the patient escapes the discomfort of lying upside down for a long period. The general anæsthetic is only given to produce a state of unconsciousness, not surgical anæsthesia. However, 12 of these cases were operated on successfully without any general anæsthetic being given. Novocaine, the Saccharine Corporation's 5 per cent. solution with adrenalin was used in the majority of the cases, the dose varying from 2½ c.c. to 3 c.c., seldom under 2¾ c.c. The boy, aged 3 with ruptured liver, was given 1 c.c. of the novocaine solution. Stovaine, Billion's 10 per cent. solution, generally 6/10 c.c., never more, sometimes 5/10 c.c., was used in the others. About 2 c.c. of spinal fluid were drawn into the syringe containing the stovaine and reinjected. I vary the dose according to the size, condition, and age of the patient, with some reference also to the size of the individual. Solutions to which glucose or other weight-giving substances have been added must not be used.

The injection is given with the patient lying on the side. Immediately after the injection the patient is turned on to the back and the thighs well flexed on the abdomen, this position is maintained for five minutes, after which the patient is got ready for the operation. The patient is put into the Trendelenburg position 15 minutes after the injection when novocaine has been used and 15 to 20 minutes after injection with stovaine, according to the rapidity with which the anæsthesia spreads upwards.

In the present series there was no case of surgical shock. In some cases there was a fall of blood pressure without quickening of pulse-rate, remedied immediately, if thought necessary, by raising the legs to a level with the rest of the inverted body; this loss of pressure which disappears when sensation and movement have returned to the legs, is, I believe, due to a mechanical vasomotor effect. Owing to the inverted position symptoms of general toxicity following absorption of the drug into the blood are practially absent.

Twelve cases were operated on without any general anæsthesia. The spinal anæsthesia in those cases, of course, was excellent. In the remaining 58 there was perfect anæsthesia and relaxation in 55. In several of these cases the operation was begun before any general anæsthetic was given; in none of them was the lid reflex abolished or the jaw relaxed by the small quantity of inhalation anæsthesia employed. In the three cases of partial failure a more or less deep inhalation anæsthesia was required. The surgeon experienced in the use of spinal anæsthesia is quite aware whether he is dealing with the complete flaccid relaxation due to intrathecal injection or the relaxation following a well administered general anæsthetic. There was no case of interference with respiration; no artificial respiration had to be done. No patient died on the table or before recovery from the paralysis. There have been no permanent sequelæ.

The Trendelenburg position was used after spinal injection in the following cases. "Recovered" in this list means that the patient recovered from the operation.

*Cases in which the Trendelenburg Position was Used after Spinal Injection.*

| | No. of cases. | Recovered. | Died. |
|---|---|---|---|
| Complete Wertheim's operation for carcinoma uteri | 14 | 11 | 3 |
| For carcinoma uteri | 5 | 5 | — |
| ,, sarcoma uteri | 1 | 1 | — |
| ,, fibroids | 18 | 17 | 1 |
| ,, ectopic gestation | 1 | 1 | — |
| ,, removal of tubes and appendix | 4 | 4 | — |
| ,, ,, ,, tube and right ovary | 2 | 2 | — |
| ,, inoperable carcinoma uteri (tying arteries) | 4 | 4 | — |
| ,, growths in the bladder | 4 | 3 | 1 |
| ,, ventral hernia | 2 | 2 | — |
| ,, ovariotomy | 3 | 3 | — |
| ,, ventral fixation | 1 | 1 | — |
| ,, appendicectomy, curetting and fixing ovaries | 1 | 1 | — |
| ,, large suppurating gland in mesentery | 1 | 1 | — |
| ,, gastro-jejunostomy | 1 | — | 1 |
| ,, carcinoma of sigmoid | 2 | 2 | — |
| ,, intestinal obstruction | 4 | 2 | 2 |
| ,, adhesions, intestinal | 1 | 1 | — |
| ,, ruptured liver | 1 | — | 1 |
| Totals | 70 | 61 | 9 |

*Particulars of the Nine Fatal Cases.*

1. Wertheim's operation. Patient died suddenly from pulmonary embolism three weeks after the operation.

2. Wertheim's operation. Patient died from hæmorrhage on the day following the operation. Much blood lost both on the table and afterwards. This was not one of Mr. Chapple's cases.

3. Wertheim's operation. Very anæmic, cachectic woman, with some œdema. She seemed to recover well from the operation at first, but died five days after.

4. Death after hysterectomy for fibroids. The patient was an enormously stout woman. The surgeon said that but for the relaxation produced by the spinal injection he could not have operated at all on account of her obesity. She recovered very well from the operation, but died from pulmonary embolism on the twenty-fifth day when practically well.

5. A young man who had been allowed to bleed from a non-malignant growth of the bladder until he was quite

exsanguined, cold, and feeble to the last degree. The growth was removed suprapubically. He was not at all worse at the end of the operation. There was no hæmorrhage. He had lost too much blood to be able to recover, and died on the third day.

6. The patient, who died after gastro-jejunostomy, recovered perfectly from the spinal injection and immediate operative interference, but died on the sixth day from acute intestinal obstruction, demonstrated by post-mortem examination.

7. The patient, who died after anastomosis for obstruction, was 18 years of age. She had been operated on eight days before for acute obstruction, a tube being put into the ileum. She died three weeks after the operation for anastomosis, the determining cause being toxicity due to the extremely septic condition of the abdominal wound, which was present before the operation done under spinal anæsthesia.

8. The other patient suffering from obstruction, who died, was a woman aged 68. She had a transposed heart. According to the report of the physician her heart was in a diseased and failing condition, apart from the acute disease, and she could not take a general anæsthetic. She had an attack of hemiplegia seven days after the operation and died a few weeks later.

9. The patient, operated on for ruptured liver, was a boy aged 3. He was suffering from intense shock with extreme dyspnœa. Several ribs were broken and the lungs were injured; there was double pneumothorax. He was not appreciably affected by the abdominal exploration, and recovered completely from the spinal paralysis, but died some hours after from the condition of his chest.

I consider that the spinal injections had nothing to do with the result in any of the nine fatal cases, that Cases 2, 3, 5, and 7 had a better chance of life than if the operations had been done under general anæsthesia, and that Cases 4, 8, and 9 could only have been operated upon under spinal anæsthesia.

I should also like to report eight cases operated on under spinal anæsthesia in the Trendelenburg position at the West London Hospital by Dr. H. J. F. Simson. The anæsthetist was Dr. A. C. Sandston, of Christchurch, N.Z. The method used was the same as I have described. All the patients have recovered from their operation and there were no sequelæ and no trouble during the operations.

*Note by* Mr. HAROLD CHAPPLE.

During the last four years I have made use of spinal anæsthesia on many occasions in operations on the female pelvic organs, and am thoroughly in agreement with Mr. Page as to its great value. As he has said, ordinarily the usual inhalation methods skilfully given are perfectly satisfactory, but when surgical shock is anticipated a spinal anæsthetic followed by sufficient ether to render the patient unconscious has proved of very great benefit. For instance, the so-called Wertheim's operation for carcinoma of the cervix, which was formerly rather dreaded because of the frequent association of great shock, can now safely be performed if this method of anæsthesia be employed, and especially if normal saline be at the same time introduced into the axillæ after the method of Arbuthnot Lane. The attitude with which one approaches this operation is now entirely different and it is not at all unusual to send the patient back to bed after a complete removal of the affected parts and a dissection of the pelvic glands with a full pulse running at about 92 or thereabouts. From the surgeon's point of view the other great advantage it affords is the complete relaxation of the abdominal muscles. This is particularly noticeable in stout women, who frequently take ether badly, and the greater ease with which the pelvic organs can be attacked is very satisfactory.

The method of introduction is simple, and if the patient be kept in a suitable position for a few minutes the extreme Trendelenburg position can be adopted with perfect safety. We have had no trouble with it, except that on a few occasions the patient has complained of severe headache for a few hours. There have been no permanent ill-effects of any kind. The momentary discomfort associated with the introduction is a small price to pay for the great advantages to be gained in the almost complete absence of shock and the facility afforded by the complete abdominal relaxation.

BRIGHTON, ROYAL PAVILION HOSPITAL. — The Queen has presented the Royal Pavilion Hospital at Brighton with a building to be used as a school for the teaching of some occupation to limbless soldiers.

# OBSERVATIONS ON THE TREATMENT OF ANAPHYLAXIS.[1]

BY ALBERT S. LEYTON, Sc.D., M.D. CANTAB., F.R.C.P. LOND.,
PROFESSOR OF PATHOLOGY, UNIVERSITY OF LEEDS;
AND
HELEN G. LEYTON, M.D. BIRM.
(*From the Department of Pathology, University of Leeds.*)

THE causation of anaphylaxis is still a matter of doubt. Of the two chief theories, one regards the anaphylactic phenomenon as due to the union of two substances producing a poisonous combination which then acts on the sensitised cells, while the other theory assumes that it results from the liberation and direct action of the toxin within the sensitised cells. We do not think the cell sensitisation essential. All the theories may be true, for the symptoms are not always alike in different species of animals, and they are not even always the same in the same species.

In the human subject some kind of indefinable sensation that the patient cannot describe precedes the more objective symptoms—namely, flushing of face, general erythema, cyanosis, and unconsciousness—which are evidently of cardio-vascular origin. This premonition in itself rather points to a central nervous cause for the whole phenomenon, and this supposition underlies some of the experiments on treatment about to be described. Death is, we think, always the result of cardiac failure, although some believe that in the guinea-pig, in which animal the respiratory symptoms are often very prominent, spasm of the pulmonary muscle is more important. Our method of experiment, in the guinea-pig, is to inject the sensitising dose (generally 0·02 c.c.) subcutaneously and the toxic dose (1 c.c. or more) into a vein of the ear. By this means we appear to obtain a larger percentage of positive results than many observers. We are able to confirm the observation that different strains of guinea-pig vary in sensitiveness and have noted that all-tan coloured guinea-pigs are especially susceptible. In other animals a disturbance of the respiratory rhythm may also be seen, even in minor anaphylactic attacks, and it may, in man, make artificial respiration necessary. Nevertheless, as the result of experiments on the excised rabbit's heart,[2] we believe that the anaphylactic phenomenon (*a*) is due mainly to a toxic combination of horse serum and patient's or animal's serum and (*b*) is dangerous chiefly on account of the effect on the central nervous system and the cardiac muscle.

We have accordingly been led to investigate some possible remedies or prophylactics.

The problem may be attacked in two ways: (1) By modification of the serum, so as to eliminate the toxic element; or (2) by treatment of the patient, either before or after the onset of symptoms.

1. *Modification of the Serum.*

This method has been attempted by several manufacturers of antitoxic sera, so far with but little success. There is no doubt that different samples of horse serum, as tested on the excised rabbit's heart, vary much in toxicity, and, further, that the amount of toxic substance diminishes after the first week of keeping. It is partly on this account that the sera from several horses are mixed and kept a little while before being issued for sale, although the accidents which happen with commercial sera show that these precautions are insufficient. Filtration through a porcelain candle will remove a very large fraction of the toxin, but unfortunately also of the other essential elements. The candles used commercially for filtering antitoxic sera also allow the anaphylatoxin to pass through.

Pasteurisation of the serum and the attempt to eliminate the toxic element by precipitation methods are both unable to make the serum innocuous. This is not surprising when we remember how very resistant the sensitising molecule is to heat and many powerful chemical substances, and the toxic molecule, although weakened, is not destroyed by the moderate heat which it is possible to apply to antitoxic sera.

[1] The expenses of this investigation were defrayed in part by a grant from the Medical Research Committee.

[2] Journal of Physiology, vol. l., 1916, p. xiii.

We have tried the effect of various chemical substances, such as iodine, chlorine, eusol, and potassium permanganate, and have found, as indeed others have already done in the case of some of them, that the toxic element cannot, by these means, be entirely eliminated. In a small number of instances the serum, after contact with iodine or eusol, did not induce anaphylaxis, but this result was not constant. For the time being, therefore, we are reduced to an attempt to prevent or to treat symptoms. The rapid onset and course of the anaphylactic shock makes the application of treatment, even if one is prepared for it, a matter of great difficulty, and the ordinary analeptics appear to be of little use.

2. *The Treatment of the Patient.*

Nevertheless, the treatment of anaphylaxis, at least in the guinea-pig, is not entirely hopeless, if due preparation is made. Rosenau and Anderson state (and our experience coincides with theirs) that untreated guinea-pigs never recover if the anaphylactic condition has proceeded to the convulsive stage. It is therefore noteworthy that the injection of alcohol or of spirit of camphor has in some cases averted death even after convulsions have begun. In four out of eight animals recovery took place after marked symptoms of anaphylaxis had set in, while among untreated animals showing only slight symptoms only 11 out of 43 recovered. The subcutaneous administration of alcohol in human cases of sudden collapse after the injection of serum is therefore worthy of trial. We have attempted also to deal prophylactically with the individual symptoms exhibited by the anaphylactic guinea-pig. In this animal both heart and lungs appear to be involved. The injection of camphorated oil just before the toxic dose of serum generally inhibits the respiratory signs; there is no cough, and after death the lungs are not unduly distended and do not show any petechiæ. But camphor will not avert the fatal issue, although it thus counteracts the respiratory signs, so that presumably respiratory failure is not the determining cause of death.

The effect of anæsthesia on anaphylaxis is a matter of dispute. Besredka has said that it inhibits the phenomenon, while Rosenau and Anderson assert that it does not. In this case it would almost seem as if the negative must outweigh the positive observation. We have not investigated the point ourselves, but as a nervous element is almost certainly involved in anaphylaxis, we have tried certain drugs, alone and in combination, acting both centrally and peripherally on the nervous system. By administering one or more of them before the serum, we have successfully averted anaphylaxis in a large percentage of instances. The drugs which we have used successfully are hyoscine, scopolamine, morphine, and atropine. Before recording the results we wish to point out a possible source of confusion and disappointment. Although the alkaloid is said to exist in four isomeric forms, the British Pharmacopœia does not distinguish between them and uses the names hyoscine and scopolamine (lævo-rotatory) as synonyms. Accordingly at least one well-known firm (A) calls its lævo-rotatory alkaloid "hyoscine" and does not use the term "scopolamine" at all, while another firm (B) supplies two different substances under the two names. We obtained preparations labelled "scopolamine" (lævo-rotatory) and "hyoscine" (racemic) respectively, and discovered a marked difference of action between them. Put shortly, it may be said that only hyoscine B was of use by itself in invariably averting anaphylaxis: scopolamine B mostly did so, but hyoscine A, which is presumably identical with it, was of no use alone.[3]

The doses given were, per 500 gm. of guinea-pig, of hyoscine or scopolamine hydrobromide, 1/400 grain; of morphine sulphate, 1/24 grain; and of atropine sulphate, 1/600 grain. The results are given in tabular form.

These results show that, in combination, both hyoscine (B) and scopolamine (A) have a distinct influence in preventing anaphylactic shock, but only hyoscine will do so by itself. This we attribute to the more central action of hyoscine as compared with the more peripheral action of scopolamine. It is therefore the preferable drug to use, but apart from other reasons, owing to the uncertainty of obtaining it and not an isomer, it is well always to order the combination with morphine and atropine. Morphine and atropine by themselves do not possess any noteworthy protective power, but appear to counteract the dangerous properties of hyoscine.

| Drugs. | No. of tests. | No. of survivals. | No. of deaths. |
|---|---|---|---|
| Hyoscine (B) ... ... ... | 10 | 10 | 0 |
| Hyoscine (B) ... ... ... Morphine... ... ... ... Atropine ... ... ... ... | 4 | 4 | 0 |
| Scopolamine (B) ... ... | 6 | 5 | 1 |
| Scopolamine (B) ... ... Morphine... ... ... ... Atropine ... ... ... ... | 7 | 4 | 3 |
| "Hyoscine" (A) ... ... | 3 | 2 | 1 |
| "Hyoscine" (A)... ... Atropine ... ... ... ... Morphine ... ... ... ... | 36 | 32 | 4 |
| Hyoscine (D) ... ... ... | 10 | 8 | 2 |
| Hyoscine (E) ... ... ... | 15 | 15 | 0 |
| Total ... ... ... | 91 | 80 | 11 |
| Controls ... ... | 63 | 24 | 39 |

Judging from the medical war literature so far published, anaphylaxis does not seem to have occurred so often as to have called for comment. Nevertheless, we would recommend strongly the employment of hyoscine previous to the injection of serum for a second time in any case where the interval since the previous injection has exceeded one week. Inasmuch as the soporific effect of hyoscine in the case of guinea-pigs is but little marked as compared with man, we may hope that it will be even more efficacious in human beings than in animals.

Leeds.

[3] Since the above was written, we have found further variations with different specimens of hyoscine and scopolamine, with which we propose to deal in another note.



# Reviews and Notices of Books.

*Medical Ethnology.*

By CHAS. E. WOODRUFF, A.M., M.D., Associate Editor of "American Medicine." London: William Heinemann. Pp. 321. Price 10*s.* 6*d.* net.

THE impression produced by the title of this book is that it deals with the diseases affecting different races, but actually the subject is considerably larger, embracing the effects of physical conditions in modifying *la bête humaine*, and thus producing and localising racial varieties. The author holds that the first human beings were black-haired animals, but not black-skinned, as their seat of development must have been in a cold country where conditions of life were hard, necessitating a great development of brain, since only the most intelligent could survive. They were originally cave-dwellers. After a time, when the earth was largely peopled with this race, there arose a large blonde type in Northern Europe—Nietzsche's "blond beast," the Teutonic superman—who established himself in a dominating position in many countries by right of conquest. To this race belonged the ancient Greeks, the original Romans, the ruling race in Egypt, and so forth. Unfortunately, this type tends to die out when it migrates from its native climate, and so in time the Romans died out and their empire fell to pieces, and the glorious period of the Greek intellect was short-lived. In the same way white races fail at the present day to establish themselves permanently in tropical climates. Such is the general view of the author on the factors of human evolution.

The various chapters of the book deal with the effects of a number of external conditions on mankind. Light is especially considered, and the author seems to look upon it as almost entirely harmful. The dark skin of tropical races serves as a protection, by cutting off the rays of light; it also assists the body in radiating its heat, but at the same time favours absorption from a hot environment, so that dark races stand such heat as that of a stoke-hole worse than light-skinned people. Contrary to common opinion, the author holds that bright light is bad for children at school, rendering them restless and irritable. The neurasthenia which affects white residents in the tropics and their children is largely due, he considers, to excessive light, aided doubtless by high temperature. Other forms of radiation are separately considered. We give this example of the author's material and manner, adding that the whole book is a storehouse of facts, collected from numberless sources,

bearing on the problems with which it deals. The material is in places somewhat undigested, leaving the general impression blurred, but, none the less, the book is exceedingly interesting. Here and there are slips. Such a statement as that the rash of scarlet fever appears on the face would make us wonder how far other and less easily verifiable statements are to be trusted, were it not that the writer's position is one that especially calls for the accurate information which he is sure to possess. Some of the conclusions, too, are surprising, as, for example, the view that those who drink alcohol in the tropics enjoy better health than abstainers. Here the author gives grounds for his statement. Again, the view that prehistoric man, with his larger skull-capacity, was more intelligent than his modern successors will not appeal to the optimistic evolutionist of the present day. Such suggestions, however, serve to challenge the thoughtful, and we commend the book to the attention of all those who wish to study in a scientific spirit man's relation to the outer world.

## JOURNALS.

*Malaria e Malattie dei Paesi Caldi.* Anno VII., February and April, 1916. Nos. 1 and 2. Rome: Via Farini 62.—In these issues there are several articles of interest, and we note especially one by E. Sergent and H. Foley, working at the Pasteur Institute in North Africa, on the recurrent fever prevalent in those localities. They find the cause to be a special spirochæte, S. berbera, belonging to the group S. obermeieri. The disease is transmitted by body lice, not by biting, but by the crushing of the insect upon the skin, whereby the virus comes in contact with excoriations or mucous surfaces. The virus undergoes a latent evolution of about a week's duration in the louse after feeding on infective material, and a similar one in the patient in the interval between the attacks. The infection is hereditary in the louse. The immunity acquired is of short duration and is in relation with the severity of the infection. It is often characterised in man by the suppression of the recurrences in a relapse whose real nature is then almost unrecognisable for the clinician without recourse being made to blood examination. Serum agglutination in a convalescent from a fever of unknown nature enables a diagnosis to be made.—Another interesting communication by Dr. P. Vadalà relates to a peculiar form of dermatitis occurring in workers with the common rush, Arundo domex. It is produced by a peculiar black dust found in the stems of this plant and has an incubation period of from 3 to 20 hours. It is erysipelatous in character and is caused either directly by contact with the black dust or perhaps by the habitual micro-organisms of the skin being roused into activity by it. Fair people are most often the victims, and relapses are frequent.—Dr. P. P. Fusco has a paper on a form of chronic cirrhosis of the liver prevalent in Tripoli, first described by Budd and Hanot as due to auto-intoxication of gastro-intestinal origin, common in all hot climates, in which, notwithstanding the severity of the symptoms, the etiology gives hopes of cure by milk diet, mild alkaline purgatives, diuretics with iodide of potassium and injections of iodine.—There are communications on Leishmaniosis interna by P. Zinconi, S. Maggiore, and A. Aravindinos, on Mediterranean fever with hæmorrhages of the skin and mucous membranes by A. Castronovo, on infantile splenic anæmia with fever by B. Santangelo, and on sandfly fever in Bengari by C. Ragazzi.

*Annali dell' Istituto Maragliano.* Vol. VIII., No. 3, March 24th, 1916. Piazza del Popolo 11, Genoa.—This issue is devoted almost entirely to researches on tubercle. The most important, by Dr. G. Costantini, treats of the tubercle bacillus and organic reaction to antituberculous vaccination, and describes the experiments made by the writer on bacteriolytic phenomena in the tissues. These seem to show that the tissues have a natural lytic action on Koch's bacilli, and that the organism defends itself vigorously at the expense of the connective tissue. A further induction is permissible; the fact that the homogeneous bacilli do not pass directly into the granular forms described by Much suggests that two types of envelope surround the bacilli, one investing each granule and the other, an external one, investing all the granules together which form the bacillus.—Dr. L. Sivori writes concerning the organic reaction to antituberculous vaccination in healthy subjects, and on tuberculous antigens in the urine.

# THE GENERAL COUNCIL OF MEDICAL EDUCATION AND REGISTRATION.

SATURDAY, MAY 27TH.

THE Council resumed its sittings at its offices, 44, Hallam-street, W. Sir DONALD MACALISTER, the President, was in the chair.

*Penal Case.*

The Council considered the case of John Thomas Dickie, L.R.C.P. Edin., L.R.C.S. Edin., registered as of Lauriston-place, Edinburgh, who had been summoned to appear before the Council on the following charge: "That being a registered medical practitioner you were on May 4th, 1916, convicted in the High Court of Justiciary on two separate charges of culpable homicide by using instruments in the bodies of each of two pregnant women and causing them to abort, and were sentenced to five years' penal servitude."

A certificate of the conviction was handed in.

The PRESIDENT intimated the decision of the Council as follows: I have to announce that John Thomas Dickie having been proved to have been guilty of a felony, the Registrar has been directed to erase his name from the Medical Register.

*Warning Notice in Regard to Uncertified Midwives.*

Sir FRANCIS CHAMPNEYS moved:—

That it be remitted to the President, in consultation with the legal advisers of the Council, to draw up, for submission to the Council, a warning notice with regard to the "covering" by medical practitioners of uncertified women practising as midwives.

He said that the Central Midwives Board had had a great deal of trouble in regard to this matter. The Council fully appreciated the danger. There had been really an attempt to put on one side the Midwives Act. That Act had reduced puerperal mortality in a very marked degree. Until the last few years the statistics with regard to mortality from puerperal sepsis showed very slight improvement. In 1902 the number of deaths from this cause per 1,000,000 of females living in this country was 118. In 1907 the number had fallen to 81 per 1,000,000, and in 1911 to 72 per 1,000,000. Before 1902 the deaths from this cause per 1000 births were never less than 4·41. In 1907 that had fallen to 3·83 per 1000 births and in 1911 to 3·67 per 1000 births. In other words, the lives of 621 women were saved in 1907 which would have been lost in 1902. These figures showed that the passing of the Midwives Act was followed by a sudden and considerable fall in the mortality, and the improvement since then had been gradual although comparatively slight. He mentioned this to show the importance of getting the terms of the Midwives Act enforced. It was plain that the reduction of puerperal mortality coincided with the introduction of the Midwives Act. This had been attributed to the elimination of unqualified and uncertified midwives. It followed almost certainly that if the Act was suspended or not administered efficiently puerperal mortality would go up again. It was said that as it was war time one should not be strict in enforcing the observance of the Act, but in his view the fact that it was war time made it all the more important that more lives than ever should be saved and that the Act should be administered efficiently. He had been asked whether there was not a shortage of midwives. The answer was, on the whole there was no shortage. The total number of midwives on the roll was 37,231, and the total of practising midwives was estimated at 14,223. There were plenty of midwives in some districts and a deficiency in others. It was a question of distribution and not of absolute numbers, but it did not follow that if the number of midwives were considerably increased there would be districts where there was not still a deficiency. What the Council had to do was to see that the Act was efficiently administered, and that this covering of unqualified practice of midwives by medical men should cease. There were all sorts of reasons given in individual instances why the practitioner had covered the unqualified practice, but none of them held water. The General Medical Council had in a sense been entrusted with the health of the nation in so far as the standard of the medical profession was concerned, and it must take care that all safeguards were maintained. If the Council did not act in their administrative capacity they would run the risk of a return to the old days when the mortality from puerperal sepsis had not been cut down.

Mr. PYE-SMITH, in seconding, said that members of the Council appreciated the danger, but what was wanted was that the whole profession should have a like appreciation of it. It was very evident from what the Council had heard this session that some of the members of the profession did not appreciate the danger. Therefore, it was most desirable that a warning notice should issue.

Dr. MACDONALD said that there was no doubt that there was a great deal of ignorance on this matter on the part of general practitioners throughout the country. He thought some such step as this was necessary to bring the matter home to them. They did not understand how they had to deal with these uncertified midwives. If the position of affairs were clearly put before them they would not take the risk. He was sure that in country districts there was a want of certified women, and there must be something done to get them to those places. Certified women would not stay in the country districts.

Dr. NEWSHOLME remarked that important figures in his possession confirmed the statements made to the Council by Sir Francis Champneys. Although there had been a very great diminution in the mortality from puerperal sepsis, there had not been a corresponding diminution in other accidents at confinements. That was particularly true of country districts. He could only ascribe this to the fact that medical assistance was not given in the measure it ought to be given to help the midwife in an emergency. That ought not to be lost sight of. Steps must be taken to subsidise the midwives in districts where they could not earn a living wage. But such steps had been taken and were being taken. The Government in the last two or three years had offered to pay to any council half the amount of the expense of placing midwives in remote districts where otherwise they would not be able to earn a living wage. The Government had also offered even in towns to pay half the fee where the mother could not pay, if the council would pay the other half. In emergency cases the Government had offered to pay half the doctor's fee, so that given the coöperation of the Government with the county and borough councils there was no reason why this need should not be met at once. It was therefore desirable that the medical profession should know all about these arrangements.

Dr. TAYLOR asked whether the Council was to understand that the county councils had to pay their share if the Government paid the half.

Dr. NEWSHOLME said that that was being done, but not really to a very great extent. The movement was in its infancy, but it was growing.

Dr. NORMAN WALKER considered that ignorance was responsible for the great majority of lapses in this matter. Whilst some of the Council's warning notices were characterised by terse brevity, he thought that this one ought to be framed at length so as to make it quite clear what the Council had in view. Medical men should be given to understand what really was the "covering" referred to in the notice. There were many medical men who did not understand what the "covering" of the practice of uncertified midwives really meant.

Sir JOHN MOORE observed that Ireland had no Midwives Act, and he asked the sympathy of the Council for the unanimous desire of the profession to obtain such an Act there. There was no question with regard to the existence of such a wish.

The PRESIDENT said that the Midwives (Scotland) Act had come into operation. It contained some of the amendments which were deemed desirable for the English Act. The Scottish Act gave great powers for the subsidy of midwives in country districts. The Notification of Births Act was also made compulsory. So far as Government support was concerned in Scotland, England, and Wales there was no question of a lack of assistance in the improvement of the midwifery service in the country and more particularly in the rural districts. The Council sympathised with Sir John Moore as to the application of the Midwives Act to Ireland, but it must be remembered that when the English Act was passed Ireland desired to be left out.

Replying to a question by Sir HENRY MORRIS, Sir FRANCIS CHAMPNEYS said that he had seen a good many letters complaining bitterly of uncertified women on whom slack local authorities would not come down, while the justices would not act. There were ridiculous words in the statute which he desired to get rid of—"habitually and for gain." That nullified a good deal. No one exactly knew what "habitually" meant. Each bench had its own ideas, if it had any ideas at all. What was "gain"? Was it "money" only, or did it include other things? Nobody knew. The whole thing was confusion. An attempt had been made to get those words kept out of the Scottish Act. He did his best, but was stopped by a Member of Parliament who seemed to take charge of the vested interests. The result was that unfortunately the words were in the Scottish Act. In some cases the justices seemed to give a sort of tribute to the uncertified women in court. In one case they applauded the woman to the skies. They fined her some ridiculous sum and paid it from the bench. The action of such people really amounted to the propagation of puerperal fever. Those who administered the Act were extremely annoyed. Dr. Newsholme could not coerce these gentlemen. The justices and the local supervising authorities were independent. He congratulated his Scottish colleagues on the Council on getting their Act. After the 13 years of experience in England he thought that Ireland might get a better statute when it came. He looked forward to having the English Act amended in time and to having the campaign against puerperal fever carried on.

The motion was unanimously agreed to.

The PRESIDENT remarked that he would in drawing up the warning notice consult with the legal advisers of the Council and also with Sir Francis Champneys and Dr. Newsholme, and try to get a warning notice to meet with the approval of the Council.

*The Finance Committee.*

Mr. TOMES moved that the report of the Finance Committee be approved. The report stated that the income of the General and Branch Councils for the year ending Dec. 31st, 1915, was £10,040 17*s.* 3*d.*, and the expenditure during the year was £6,471 8*s.* 1*d.*, consequently there was a surplus of £3,569 9*s.* 2*d.* The report went on to state—

The income of the General Council was £2067 7*s.* 2*d.*, as against £1121 16*s.* 7*d.* in 1914, an increase of £945 10*s.* 7*d.* Practically the whole of this is due to the abnormal number of colonial and foreign registrations, which are credited to the General Council's account and not to the branches. Numerous colonial practitioners came over to help in the naval and military forces, and many Belgian doctors were enabled to maintain themselves by practising and to take the place of British practitioners who had gone to the front. The English and Scottish branches both show a decrease in fees, the former of £640 and the latter of £326, while the Irish branch shows a small increase of £36. It may be hoped that colonial and foreign registrations will continue to remain at a high figure for the present year, if not so high as before. As many senior students have been recalled from the colours to complete their studies, the British registrations should not show a large decrease at present. Probably, however, there are lean years ahead, and the Council's finances must be carefully watched if they are to continue satisfactory. The number of students registered was 1918, as against 1600 in 1914 and 1480 in 1913, out of the 1918 between 400 and 500 being women. This is highly satisfactory, and gives ground for the expectation that in due course the wastage of the war is likely to be made up.

The expenditure of the General Council shows a decrease of £1184 11*s.* The sessions, owing to their brevity, cost £321 less. The printing of Registers cost £342 less, as under the new contract there is a much greater saving when fresh entries are fewer. As no circulars were issued for the correction of the Register, this alone accounting for a saving of £263, the total economy is considerable. The cost of reporting on the Apothecaries' Hall examinations was £121 less; and £431 less was paid for interest on mortgage and loan. On the other hand, general printing cost about £60 more, the increase being due to increased prices during the war; £192 more was paid for rent, and house expenses were £62 higher. It is too soon to express a definite opinion as to the financial result of building the new premises; the Council was much handicapped by having to do the work at a largely increased cost due to the war, but it may be hoped that the annual expenditure will not be much increased, if at all, by the change. It is not yet possible to make a correct estimate of the current household expenses of the new building, which must necessarily show an increase in some directions, but there can be no doubt that comfort and convenience of the members, the staff, and the public will be vastly greater. The expenditure of the branches over which they have direct control (i.e., exclusive of the contributions required by the General Council) shows a small increase in the aggregate of £105.

The surplus of £3569 9*s.* 2*d.* for 1915, as compared with the surplus of £2299 18*s.* 4*d.* in 1916, shows an increase of £1269 10*s.* 10*d.*, due to a net increase of income of £190 2*s.* 9*d.* and a net decrease of expenditure of £1079 8*s.* 1*d.* This may be regarded as highly satisfactory for the time being; but the prospect of a probable decrease in fees for some years to come, and the cost of elections of Direct Representatives which are only postponed, lead the committee to offer a word of warning against undue optimism.

Mr. TOMES, in a brief comment on the report, said that although the financial position was satisfactory at the moment the committee had reason to fear that it would not remain so satisfactory in future years.

Sir HENRY MORRIS seconded, and the report was approved.

*The Teaching of Medical Ethics.*

Dr. MACKAY submitted a report by the Education Committee on the teaching of medical ethics. It was in the following terms:—

On Nov. 4th, 1915, the following resolution was adopted by the General Medical Council: "That it be remitted to the Education Committee, with the addition for this purpose of Dr. McVail and Dr. Newsholme, to report to the next meeting of Council on the education of medical students in the ethical relationships of medical practitioners to the State, to their patients, and to each other, and that the committee have power to make such inquiries on the subject as it deems advisable." A letter addressed by the Acting Registrar to all the teaching bodies elicited the information that in most cases the subject is dealt with as part of the regular work in the courses of forensic medicine and public health, to some extent also in other classes, and occasionally in special lectures. In a number of instances, however, no regular instruction has hitherto been given. The committee are of opinion that it is advisable that the subject should not be neglected in the education of the medical student; but they recognise that the special arrangements adopted for conveying the instruction may naturally vary among the different bodies. They propose, therefore, that a general recommendation dealing with the teaching of medical ethics be added to the "resolution of the General Medical Council in regard to professional education" as adopted on June 6th, 1912, as follows, viz.:—"Instruction should be given, in the courses of Forensic Medicine and Public Health, or otherwise, on the duties which devolve upon practitioners in their relationship to the State, and on the generally recognised rules of medical ethics. Attention should be called to all notices on these subjects issued by the General Medical Council."

In moving that the general recommendation contained in the last paragraph of the report should be adopted Dr. MACKAY said that it had not been thought necessary to print in detail the letters which had been received. The committee was unanimously of opinion that one of the aspects of the subject with which the recommendation dealt was of the greatest importance—the ethical relation of the medical practitioner to the State. The recommendation was put forward as one of a general kind. The committee was of opinion that the subject should not be neglected. It did not think it advisable to suggest any particular method of dealing with the subject. Only it should not be neglected in the medical curriculum. The committee also thought it right, considering the importance of the various notices dealing with questions of medical ethics which had been issued by the Council, that the attention of future practitioners should be called to them. That would safeguard them later on when there was a danger of falling into error. It was of advantage that pitfalls which lay in their way should be clearly pointed out to them.

Dr. NORMAN MOORE seconded. It was most natural, he said, that the Council should draw the attention of the teaching bodies to this matter. The Council did not force the recommendation on the qualifying bodies, but it certainly laid it before them as desirable.

The recommendation of the committee was adopted.

*Dental Education.*

Mr. TOMES brought up a report from the Dental Education and Examination Committee which dealt with several matters. He said that an application had been received from the University of St. Andrews for the recognition of a dental diploma instituted by it, the title of which was Licentiateship in Dental Surgery. The curriculum arranged and the examinations proposed carried out the recommendations of the Council. In accordance with the opinions of the committee he moved:—

That the licence be recognised for registration in the Dentists Register.

Dr. KNOX seconded, and the motion was agreed to.

A motion by Mr. TOMES for the registration in the colonial list of the Dentists Register of a diplomate of Adelaide University who had been offered a commission in the army was agreed to.

In connexion with this application Dr. SAUNDBY remarked that the dental profession deserved a public tribute for the work its members had done in connexion with the army.

Mr. TOMES then proceeded to deal with the portion of the report relating to the dental curriculum. He said that more than a year ago a motion made to the Council noted that the number of dentists on the Dentists Register had not increased since the Register was formed, and expressed the view that the licensing bodies should be asked to make suggestions as to "any modifications or curtailments of the curriculum which in their view may be practicable without lowering the standard of dental practice." The motion was referred to the Dental Education and Examination Committee for consideration. The committee considered that, whilst the original resolution suggested that "modifications or curtailments of the curriculum" might be desirable, the resolution obviously opened the question not merely of the curriculum, but of any other causes which might be at work to deter students from entering, and the questions submitted to the licensing and educational bodies were therefore extended in this direction. An interim report was issued in November, 1915, which contained the questions circulated, but the answers at that time had not all been received. These answers were now complete. There was absolute unanimity amongst the answers in attributing any shortage, if it existed—some thought there was no shortage—mainly to the inadequacy of the Dentists Act, and in the opinion of the majority this was the sole cause. This was also the unanimous opinion of the committee. With regard to the effect of the preliminary examinations, which were the same as those required of medical students, one body alone considered them too stringent. The others agreed that they were only deterrent to those unfit to enter upon professional study with advantage. But several bodies were of opinion that there should be more opportunity given for option in the subjects of examination, and, especially, that Latin should be an optional subject. The committee, without expressing any opinion upon the subjects of the Preliminary Examination, were unanimous in considering that it should be the same for dental as for medical students. With regard to the length and stringency of the curriculum as a deterrent, there was a general opinion expressed that its effect is slight as compared with that of the legal position and that without lowering the standard of dental practice no curtailment of the four years required was possible. But many suggestions, some of them entering into full detail, were made for the improvement of the curriculum and for some rearrangement of the examinations. In general terms the modifications suggested were in the direction of closer adaptation to the special needs of the dental practitioner and involved material limitation of teaching in general subjects, such as anatomy, physiology, surgery, and medicine. In face of the body of opinion offered the committee felt that these suggestions should be carefully coördinated and the committee's recommendations on the subject of the dental curriculum be considered in relation to them. This, however, involved work that would take time and could not be reported upon at the present session. The members of the committee regretted that they saw no means which the Council could adopt which would be effective in preventing the public being deceived by inability to distinguish between qualified and unqualified practitioners of dentistry, short of attempting to procure an amendment of the Dentists Act, a course which at the present juncture did not appear practicable. He moved that the report be approved.

Dr. SAUNDBY asked whether any of the bodies called attention to the cost of the dental curriculum. A medical student took his curriculum at a less cost than a dental student—sometimes almost as much as £100.

Mr. TOMES replied that certain bodies did call attention to that point. So far as the Council was concerned, the fee was a matter to be fixed by the educational body or school.

Dr. NEWSHOLME moved as an amendment that the report should be referred back to the committee. The real question was whether any modifications or curtailments of the curriculum were desirable without lowering the standard of dental practice. The committee had not expressed an opinion on that essential point. He thought that the committee should have satisfied itself whether there was a deficiency of dental practitioners or not. It was the case that although the number of dental practitioners on the Register had not increased, yet the number of those who held dental licences had increased, but it could not be maintained that the number had increased in proportion to the population in the last 30 years. The State had a very large stake in this matter at the present time. It had made itself responsible for the medical treatment roughly of a third of the population of the United Kingdom. That medical treatment was often rendered useless owing to the presence of bad teeth. Then there was the medical inspection of school children. A large proportion of the children were found to be suffering from dental caries. In a great many instances nothing had been done but record the statistics. A large part of the population of England and Wales were, moreover, receiving a dental treatment which was unsatisfactory and detrimental to public health. He thought that there were 5000 qualified dentists in the country and something like 20,000 unqualified dentists. That was a grave reflection on someone. It was a grave reflection upon the Council until it had taken every practical step to get an increased number of qualified dentists. The Council was entitled to have a report from the Dental Education and Examination Committee on certain questions. Firstly, it was entitled to have its opinion on the question whether there was a shortage of dental surgeons; secondly, it was entitled to an opinion whether modifications of the curriculum were practicable; and, thirdly, whether the curtailment of the curriculum might not be feasible.

Sir BERTRAM WINDLE seconded the amendment. He remarked that in practice the qualified dentist was at one disadvantage because he was under restrictions which the unqualified man was not. Until they had this cardinal matter put right the Council could not expect any increase in the number of qualified dental practitioners. He wanted to say this, that the institution which he belonged to recommended the shortening of the curriculum to three years, but only temporarily, in order that the shortage in the number of dental practitioners might be made up. An adequate supply of dentists was of extreme importance to public health. The committee, he thought, should not take the attitude that nothing could be done. After the war there would be a shout for social legislation, and those who had shouted loudest would be first served.

Sir HENRY MORRIS said that there were many suggestions as to modifying the dental curriculum so as to make it more absolutely applicable to the career of the dentist after qualification, and thereby to make it more easy to bring it and the qualification which followed it within the period of four years, instead of having that period prolonged, as it was sometimes now, beyond four years. That was feasible, and this would be brought out when the various reports from the licensing bodies were coördinated. It would be of assistance to the Council if it had statistics relating to the proportion of dentists to the population. Instead of the amendment referring the report back to the committee he would suggest a motion in these words: "That a copy of the report be sent out to the licensing authorities and dental schools, that the committee consider any further recommendations that may be received from them on the subject of the curriculum, and that the committee be instructed to prepare for submission to the Council such proposals as the committee may deem desirable for the modification of the curriculum."

Dr. NEWSHOLME did not think that the report should be sent to the licensing bodies, but otherwise he had no objection to what Sir Henry Morris suggested.

Dr. MACKAY pointed out that the report was only an interim one. The wisest plan would be that Mr. Tomes should not insist upon the approval of the report, and that Dr. Newsholme and Sir Bertram Windle should not insist upon referring it back to the committee. The committee had told the Council that an alteration of the law was required and that nothing else could suffice. It was for the Council to say whether they would approach the Government on the subject. He was ready to do that now. As regarded the curriculum, he hoped that the Council would never insist on the alteration of the curriculum in the way of reducing it so as to attract greater numbers of students. If an alteration was proposed it must be to make the course of study more effective and more suited to its purpose. The Dental Education and Examination Committee was considering the subject. It would not be wise to have an alteration which was based on the notion that it would make entry to the profession of dentistry easier. Let the committee finish its work, and then the subject could be discussed.

Dr. NEWSHOLME then substituted for his amendment the following: "That the committee be requested to consider any further communications which may be received from the licensing authorities and the dental schools on the subject of the curriculum, and that it be instructed to prepare for submission to the Council such proposals as it deems desirable for the modification of the curriculum."

Mr. TOMES withdrew his motion that the report be approved.

The substituted amendment of Dr. Newsholme was then put as a motion and was agreed to.

Mr. HODSDON moved: "That the Lord President of the Council be informed that in the opinion of the General Medical Council it is urgently necessary in the public interest that steps be taken to amend the Dentists Act in order that the public may be able to distinguish qualified from unqualified practitioners as dentists."

Dr. LANGLEY BROWNE seconded.

Mr. TOMES suggested that a memorandum should accompany the resolution to the Lord President setting out the arguments on which it was based.

The motion was agreed to.

A motion proposed by Sir BERTRAM WINDLE to the effect that the committee be instructed to obtain statistics as to the relative cost of medical and dental education was also carried. It was also agreed, on the motion of Dr. CATON, that Dr. Newsholme should be added to the members of the committee.

*Apothecaries' Hall of Ireland.*

A report was received from the Examination Committee on various matters relating to the Apothecaries' Hall of Ireland.

*Indian Subordinate Medical Department.*

A report was received from the Examination Committee on communications from the India Office in regard to a revised prospectus of the Assistant Surgeon Branch of the Indian Subordinate Medical Department. The report was in the following terms:—

In a report, dated June 2nd, 1915, the Examination Committee informed the General Council that it had been learned from the India Office that the course of professional study for the Indian Subordinate Medical Service would be extended in the future from four to five years, and that prior to its commencement candidates would be required to pass a preliminary examination recognised by the General Medical Council. On Nov. 16th, 1915, the India Office forwarded for the information of the General Council a proof copy of the revised prospectus relating to the Military Assistant Surgeon Branch of the Indian Subordinate Medical Department. In a later communication, dated April 24th, 1916, however, the India Office intimated that in consequence of certain difficulties which had arisen, it had been decided to defer for another year the introduction of the scheme for improving the education and training of military assistant surgeons. The Examination Committee do not propose to offer any observations on the revised prospectus for the consideration of the General Council at this stage.

*Public Health Committee.*

Sir JOHN MOORE presented a short report from the Public Health Committee in which it was stated that the further consideration of the statistics relating to the examinations for qualifications in public health would be deferred until the next session of the Council.

*Pharmacopœia Committee.*

The following report was received from the Pharmacopœia Committee:—

1. The number of copies of the British Pharmacopœia, 1914, which were sold by the publishers between Nov. 1st, 1915, and May 20th, 1916, was 960. The total number sold since Jan. 1st, 1915, is thus about 25,400 copies. Of the second issue of 10,000 copies published in May, 1915, about 3200 copies remain in stock at the present date.

2. The editors have discovered a misprint on page 29, under the heading "Adeps Lanæ." In the eighth line from the foot of the page for the words "0·2 gramme" should be read the words "2·0 grammes." This error will be corrected in the next impression.

3. The recommendation contained in the committee's report of Nov. 2nd, 1915, having been approved by the Council, a communication was addressed to the Lord President, suggesting that, in the public interest, all preparations or admixtures, containing 0·75 or more per cent. of morphine, should be included in Part I. of the Schedule of the Pharmacy Act. The suggestion was conveyed by the Lord President to the Council of the Pharmaceutical Society of Great Britain. The Council of the Society, in virtue of its powers under the Pharmacy Acts, submitted a resolution in favour of the suggested amendment of the Schedule for the approval of the Privy Council. An Order in Council was thereupon issued on Feb. 9th, 1916, which enacts the amendment in the manner prescribed by law. The Executive Committee has already expressed its gratificaton at the action taken by the Privy Council and by the Pharmaceutical Society in this important matter. The Pharmacopœia Committee desires also to express its acknowledgments of the action which has been taken at its suggestion. All tinctures of opium, whether described as "Laudanum B.P. 1898" or otherwise, which contain three-fourths of 1 per cent. of morphine, must now be sold to the public only under the more stringent conditions attached to the sale of the poisons in the first part of the Schedule.

*Students' Registration Committee.*—A report was received from the Students' Registration Committee.

*Appointment of Committees.*

Business Committee: Dr. Norman Moore (chairman), the President, Sir Henry Morris, Dr. Norman Walker, and Dr. Little.

Pharmacopœia Committee: The President (chairman), Dr. Norman Moore, Sir George Philipson, Dr. Caton, Dr. Barrs, Dr. Cash, Sir John Moore, Dr. Norman Walker, and Dr. Little.

Finance Committee: Mr. Tomes (chairman), the President, Sir Henry Morris, Mr. Hodsdon, and Dr. Little.

Dental Committee: The President (chairman), Sir Henry Morris, Mr. Tomes, Mr. Hodsdon, and Sir A. Chance.

Dental Education and Examination Committee: Mr. Tomes (chairman), the President, Sir Henry Morris, Mr. Hodsdon, Dr. Knox, Sir Arthur Chance, and Dr. Symington.

Students Registration Committee: Dr. Norman Moore (chairman), the President, Dr. Langley Browne, Dr. Mackay, Dr. Norman Walker, Sir Bertram Windle, and Dr. Kidd.

Penal Cases Committee: Dr. Saundby, Mr. Tomes, Dr. Norman Walker, and Dr. Little.

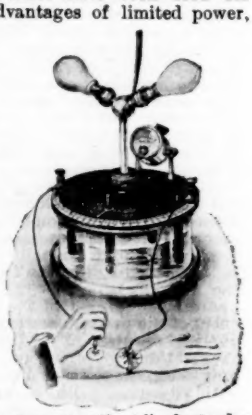
*Appointment of Registrar.*—Lieutenant-Colonel Norman King was reappointed General Registrar.

The President having been thanked for his services in the chair, the summer session of the Council concluded.

# New Inventions.

## USE OF CURRENT FROM THE MAINS FOR MEDICAL PURPOSES.

THE Medical Supply Association, Gray's Inn-road, London, W.C., has introduced a device for safely utilising the main supply of electricity for medical purposes, such as galvanisation, ionisation, electrolysis, and muscle reaction testing. Hitherto constant current batteries have been used for medical work with their disadvantages of limited power, coarse adjustment, heavy weight, heavy expense and delay in re-charging, and the risk of corroding of the terminals.



These disadvantages are not present with the "Galvanoset," which may be attached to any electric light holder. The current is then conducted through two suitable resistances into a vessel of water by means of two electrically indestructible electrodes, which are placed on opposite sides of the vessel. At right angles to these two electrodes a second pair of electrodes is placed in the water; these are connected to the patient. As long as the two "patient" electrodes remain at right angles to the two "supply" electrodes no current will be obtained, as the electrical potential in this position will be zero. The supply terminals are mounted on a disc of vulcanite which is free to rotate over a graduated celluloid scale. If this disc is now rotated from its right angle or zero position, any desired current can be obtained from minimum to maximum by the most gradual increase. At the same time it is impossible for the patient to get into direct contact with either the positive or negative side of the supply. The weight of the complete apparatus is 7 lb. It can be used either on continuous or alternating main current of any voltage. In working from alternating current one of the electrodes is replaced by one of a special metal.

# THE LANCET.

*LONDON: SATURDAY, JUNE 10, 1916.*


## Medical Practitioners and the Military Service Acts.

WE stated last week the position of medical men in relation to the obligation imposed upon all citizens by the provisions of the Military Service Acts. A circular which has now been issued by the Local Government Board to the local tribunals and appeal tribunals under the Acts sets out clearly the course which medical practitioners who come within the operation of the Acts and who wish to be exempted must now adopt. The new Military Service Act, an extension, with continued operation, of its predecessor, contains a section in which are set out the provisions as to exemptions from service under the Acts. The section is as follows:—

Regulations made under the second schedule to the principal Act shall provide for the establishment of professional committees to deal with claims for exemption made by duly qualified medical practitioners; and any application made by such a medical practitioner on any ground, other than that of conscientious objection, for a certificate of exemption shall be referred by the tribunal to whom it is made to such a committee in accordance with those regulations; and the recommendation of the committee on the application shall be binding on any tribunal constituted under the principal Act.

The new regulations, made necessary by the extended Act, have now been issued by the Local Government Board to all local tribunals and appeal tribunals, and the particular regulation affecting medical practitioners is very clearly worded, and gives effect to what we were able last week to say would be the position. It runs:—

Medical practitioners who come within the operation of the Acts and wish to be exempted must as hitherto apply to the appropriate local tribunal. But in view of the special position of the medical profession, their services being in great demand both by the army and by the civil population, the Act makes provision for applications for exemption from medical practitioners being considered by professional committees which will be fully aware of the special arrangements which can be made in any case, and will be able to deal with each case from the point of view of the needs and resources of the country as a whole, not simply of those of a particular locality. It has therefore been provided that each application for exemption by, or in respect of, a duly qualified medical practitioner, other than an application solely on conscientious grounds, shall be forthwith referred by the local tribunal to a central professional committee, and that the recommendation of this committee shall be binding on the tribunal. If an application is made by a medical practitioner both on conscientious and on other grounds, it is to be referred forthwith to the professional committee for their recommendation on the other grounds. On receipt of the recommendation from the professional committee the tribunal will then, unless the recommendation is for absolute exemption, consider the application on conscientious grounds, after due notice, and will decide whether the certificate, if any, should be confined to the recommendation made by the professional committee in respect of the other grounds, or whether it should be modified in favour of the applicant in view of the conscientious objection. The tribunal will not in any case be able to grant a certificate less favourable to the applicant than has been recommended by the professional committee.

The separate regulations concerned in the exemption of medical practitioners will be found on p. 1195 of this issue of THE LANCET. It will be observed that the numbers of the Central Professional Committee are defined in these regulations; that the recognition of the Army Council, which has already been granted to the three existing committees, is required; and that the central body is given power to refer cases to local professional committees for investigation if this is thought desirable. The cases of practitioners on the residential or teaching staffs of hospitals situated within the Administrative County of London are, by the regulations, made the particular charge of the Committee of Reference of the Royal College of Physicians of London and the Royal College of Surgeons of England, who will advise also on the case of any English or Welsh practitioner at the request of the Army Council or the Central Professional Committee. Communications to this body concerning practitioners in England and Wales should be addressed to the Secretary, Central Medical War Committee, 429, Strand, London, W.C. The Scottish Medical Service Emergency Committee is the analogous statutory body for Scotland.

A circular issued to local and appeal tribunals by the Local Government Board points out that the Act recently passed, while making a new demand on the administrative ability of the country, gives force to a national endeavour to secure a finer adjustment between the rival claims of military, civilian, and professional requirements than has ever been attempted before at any time or in any country. We think that this praise of the new legislation is well deserved, and that the adjustment, which has to be effected under conditions of extreme urgency, is in the matter of the medical profession being bravely carried out. The circular strikes exactly the right note when it points out that the services of the medical profession are in great demand by the navy, army, and civil population. It is because the medical practitioner is wanted in all three ways as a medical practitioner that his professional position is totally different from that of other civilians, who have mostly to acquire a new training before their help is of first-class value. This situation warrants the differential treatment now offered to doctors. The work of the Central Professional Committee will be difficult; the responsibility accepted by the Central Medical War Committee, the Committee of Reference of the English Royal Colleges, and the Scottish Medical Service Emergency Committee is very heavy; but we have every reason to believe that the work

will be done to the satisfaction of the naval and military services and of the public, while medical practitioners are afforded a proper opportunity of explaining their position to persons who will be able to appreciate professional situations and complications. It is to be remembered that no medical man of military age who is enrolled with one of the Committees, or who enrols before June 24th, is required to apply for exemption. The production of his certificate of enrolment is all that is necessary in the event of a notice calling him up being sent to him; such message will only have been sent through some oversight. It is well, too, to recollect that the man who remains unenrolled after June 24th will no longer have the chance of serving for one year only, or of drawing the pay and allowances given to the present temporary lieutenant. If taken for service the unenrolled man will serve for the duration of the war at the ordinary pay of the particular branch of the service into which he is received. Consequently it would seem unwise for any medical man of military age to remain unenrolled.

## Injuries of the Brain in War.

HIPPOCRATES laid it down that an injury of the brain was always deadly, though it is not quite certain that the word he employs necessarily means fatal. It has, however, for many years been recognised that occasionally patients may recover from even very severe injuries of the brain, but it was only with the advent of the recognition of the bacterial origin of suppuration that the surgeon has been able to treat brain injuries intelligently. The present war has brought before surgeons an immense number of cases in which the skull and brain have suffered injury; in fact, it may be said with confidence that never before have surgeons engaged in the treatment of the wounded been confronted with such a variety and concourse of cases in which some damage has been done to the brain. Surgeons have been compelled to reconsider the question as to the best methods of dealing with these injuries, and a paper on this subject in THE LANCET of May 20th was very timely. In it Major ALEXANDER DON deals with the treatment of head injuries at a casualty clearing station, attention being given alike to the nature of the injury and the possibilities of the station. At present the conditions in Flanders are somewhat different from those likely to obtain near a more active front, though no one supposes that the conditions need last. In ordinary circumstances the casualty clearing station is a movable hospital following at a certain distance behind an advancing line or retiring if the front retires, but the introduction of trench warfare has modified this. Where the front has not materially changed for 18 months the clearing station has become fixed, and therefore in some degree the conditions have approached to those which are to be found in a base hospital, a state of affairs which may at any moment be altered. Cases of head injury often arrive at the casualty clearing station in an unconscious state, and this is specially noticeable in those who have been carried in the lying position over the 20 or 30 miles separating the clearing station from the front. Those who have been brought in the sitting position much less frequently show signs of collapse. This collapse, following a long drive in a motor ambulance over bad roads, is to be attributed to the repeated small shocks caused by the jolting of the motor-car. As a rule, and with little more than intelligent nursing the patients recover from the collapse within three or four hours, and they may then be taken to the operating theatre; operation is not recommended on subjects which do not react soon.

What are the limits of the operations that should be performed at the clearing station? It is clear that no sharp lines can be drawn, but certain limits will suggest themselves. It is necessary that where increased intracranial tension is present provision should be made for its relief. The opening in the skull may need to be made larger, and if necessary a trephine is used; the wound of the dura mater may be enlarged so that blood-clot and any obvious splinters of bone may be removed, or any foreign bodies that are visible. But it is in the highest degree undesirable that any extensive search should be made for foreign bodies, and probing is not merely useless, it is often actively harmful. To obtain due access to the wounded skull and brain two forms of incision are employed; in one a large semicircular flap is made, and in the other there is little more than the linear enlargement of the scalp wound. While the large flap is undoubtedly the more convenient for any extensive operation on the brain such as may reasonably be done at a base hospital, the linear incision is much more suitable for the early treatment at the clearing station. This is the opinion expressed by Major DON, and with it we agree. If increased intracranial pressure is present from effused blood, opening of the dura mater will relieve the pressure. When we have mentioned these operations we have given almost all that can be done as a rule at a clearing station. When an X ray apparatus is available—and this is rarely the case in a mobile hospital—the extent of the work may in times of quiet be somewhat increased, and irregular septic masses or fragments of shell may be removed; but as a rule all these elaborate operations on the brain are done with better chance of success at base hospitals or in special hospitals, where the patients can remain for an indefinite period.

The time at the disposal of the surgeons at the casualty clearing station will have much influence on the scope of the operations performed, an obvious fact which has been entirely forgotten by some of the critics of the administration of medical affairs at the front—indeed, what have some of these persons not forgotten or imagined? When a great engagement is in progress the number of cases arriving at the clearing station will be so great that the surgeon will have to be content in many instances with doing little more than redressing the wounds, for he will have to send on to the base hospital as rapidly as possible

those patients who are best able, in his opinion, to stand the journey. For if he does not do so his hospital will speedily become overcrowded and he will be unable to admit any of the ceaseless stream of new cases. Major DON'S paper is of great interest because he brings these points out; to those who know them they are of course very obvious, but for civilians, medical as well as lay, their significance might easily be lost. It may well be that some differences of opinion will be found to exist in respect of some of Major DON'S views, but we believe that the conclusions at which he has arrived will be endorsed in the main by those who have had experience in the treatment of wounds of the brain in similar circumstances. And the whole subject is one of paramount importance to the army.

# Annotations.

"Ne quid nimis."

## THE BIRTHDAY HONOURS.

FOR the most part the list of Birthday Honours contains the names of those who have won distinction in connexion with the war. These honours will be found noted in another column. But quite directly connected with the war is the Privy Councillorship conferred upon Dr. Christopher Addison, M.P., Parliamentary Secretary to the Ministry of Munitions (who was at one time lecturer in anatomy in the medical schools of Charing Cross and St. Bartholomew's Hospitals), and the knighthoods granted to Dr. Armand Marc Ruffer, C.M.G., and Professor Nestor Tirard. Sir Armand Ruffer is President of the Sanitary Maritime and Quarantine Council of Egypt, and it is largely owing to his careful supervision that Egypt has remained of late years so remarkably free from epidemic disease. Sir Nestor Tirard is professor of the principles and practice of medicine in King's College, and senior physician to King's College Hospital, as well as commandant of the 3rd London General Hospital. His labours as the medical editor of the British Pharmacopœia and as secretary for 20 years of the Pharmaceutical Committee of the General Medical Council are well known to all the medical profession. Dr. Frederick Montizambert, I.S.O., Director-General of Public Health of Canada, has been awarded a C.M.G., and Fleet-Surgeon Ernest Courtney Lomas, R.N., D.S.O., Surgeon-General John Jeffrys Dennis, R.N., Colonel Alfred Percy Blenkinsop, Assistant Director-General, A.M.S., and Major Percy Samuel Lelean, Assistant Professor, Royal Army Medical College, have been made C.B.'s. Dr. Noel Bardswell, medical superintendent of King Edward VII. Sanatorium, and Dr. Frederick Hewett, Surgeon Apothecary to the King, have been made members of the Fourth Class of the Victorian Order. In the Indian List, Major Frederick Norman White, Assistant Director-General, I.M.S. (Sanitary), Lieutenant-Colonel James Jackson, I.M.S., Inspector-General of Prisons, Bombay, and Captain Alexander Gillilan Johnson Macilwaine, R.A.M.C., have received the C.I.E., and Mr. Henry Martyn Newton, F.R.C.S., Dr. Robert George Robson, and the Rev. Peter Cullen, Brigade-Surgeon Lieutenant-Colonel, I.M.S. (retired), have been awarded the Kaisar-i-Hind Gold Medal. Sir Bernard Mallet, Registrar-General, who becomes K.C.B., should be included in the list of medical honours, having regard to the close relation of his work to public medicine. To all these gentlemen we tender our sincere congratulations, as well as to Sir George Beilby, F.R.S., whose studies on fuel economy and smoke prevention have now been fittingly rewarded. Also outside the medical profession we note with satisfaction the names of Sir Savile Crossley, who has been raised to the peerage, and Mr. C. Arthur Pearson, who has been made a baronet. Both are well known for their work in the relief of suffering and physical disability.

## PROTOZOAL INFECTIONS OF THE INTESTINE.

WE print in this issue four papers dealing with the subject of protozoal infections of the intestine. Dysentery and diarrhœa have caused much invaliding in the British forces engaged in the war, and have at the same time supplied a large amount of clinical and pathological material for special study. Among the various intestinal protozoa which have come of late into greater prominence is the Lamblia intestinalis. Its pathogenicity in man has not hitherto been clearly established, but there seems to be some support given to this view in the papers we now publish. Up to a recent date most of the cases reported came from Indo-China, and to a much smaller extent from the shores of the Mediterranean, though some cases have been observed in the Panama Canal zone. In one of the papers mention is made of a soldier who contracted his infection in Flanders. Lambliasis is not uncommon among rats and mice, which have been accused of conveying the disease to man. Some instances have been published in which children have suffered after eating food to which rats and mice had had access. Perhaps the Flanders case referred to above may have arisen in this way, since the trenches are known to be infested with rats, which make raids upon the soldiers' food stores. Lambliasis may coexist with amœbiasis and other protozoal infections. The treatment seems to have been, so far, not very satisfactory, but Miss Annie Porter, D.Sc., mentions in her paper that good results had been secured in some cases by the administration of bismuth salicylate, and that the organisms and their cysts had disappeared from the stools. It seems to us that this method of treatment deserves to be given a more extended trial, with a view of getting rid of an infection which has been shown to be very persistent.

## ASH AS AN ASSET.

IN an annotation which appeared in THE LANCET just 12 years ago attention was drawn to the enormous waste of valuable mineral salts through casting the ash of tobacco, burnt in the cigar, pipe, and cigarette, to the winds. The calculation was quoted that a ton of tobacco withdraws over a hundredweight of mineral constituents from an acre of land. Amongst these constituents are potash and phosphoric acid. In view of the shortage particularly of potash, owing to the supplies from the Stassfurt mines in Germany being cut off, the question assumes a new importance, and with this view in mind a writer in the *Chemical News* of June 2nd gives some interesting facts concerning the amount of mineral salts wasted annually in this manner by the smoking public in this country. Mr. B. A.

Burrell, F.I.C., points out that the ash of tobacco amounts to 30 per cent., and that one-fifth of this, or 6 per cent., is potash. The results of a systematic collecting of tobacco ash were as follows. From the smoke-room of a club, collected for eight days, 9¾ ounces; from the lounge of a large hotel, collected for four days, 13 ounces; from a large restaurant, collected for ten days, 2 lb. 8 ounces; from a music-hall, one-tenth part of the auditorium, one performance only, 4 ounces. Coming to practical conclusions, he finds, from particulars supplied to him by a firm of tobacco and cigar importers, that the total consumption of tobacco and cigars in this country amounts to 44,529 tons, which when burnt gives an ash weighing 13,359 tons. Assuming that this ash contains one-fifth of its weight of potash, the yield would be 2672 tons. Kainit, the potassic mineral brought up from the mines in Stassfurt in Germany, contains 12·5 per cent. of potash; so there may be lost in tobacco ash an equivalent of 21,376 tons of kainit. At the price of this mineral in the spring of 1914, this would mean throwing away over £50,000 worth of kainit, but in the following spring of 1915 the price of kainit was trebled. While these facts may well arrest our attention, the difficulty presented of effectively collecting tobacco ash would seem to be very great. The success of such an undertaking would rest entirely on the unanimous action—and it would have to be unanimous if the figures quoted are to be realised—of millions of agents. Even with such a unanimous action secured the difficulties of capturing every ounce of the ash formed in every cigarette, cigar, and pipe would probably render the calculation void. However, so many reforms have become possible and practicable under the incontestable demands of war that the suggestion to effect the economy indicated may be seriously considered. It may be added that the shortage of potash, amongst other things, is a real and distinct inconvenience in medical practice, apart from the necessities of agriculture.

## THE INFLUENCE OF DIET ON THE DEVELOPMENT OF CAMMIDGE'S REACTION IN THE URINE.

BEING firm believers in the value of Cammidge's reaction as a test of the functional efficiency of the pancreas, Dr. C. J. C. Van Hoogenhuyze and Dr. S. Nagasaki have recently published[1] some investigations in which they show that the presence or absence of this urinary test depends in many cases upon the diet. They point out that the mother-substance that gives rise to the crystals produced in the reaction is a dextrin-like body, possibly isomaltose, that is present in normal urine, a point proved by Pekelharing and Van Hoogenhuyze. Further, they find that the reaction can be caused to appear or to disappear by increasing or diminishing the amount of carbohydrate in the patient's diet. This explains how it is that the urine of normal persons has often been found to give a positive Cammidge's reaction; the conclusion drawn is that dextrinuria is not necessarily pathological, a sign of disease. Naturally it is the amount of the dextrinuria that is important here; a small amount may be regarded as not abnormal, while a larger amount will be held to throw suspicion on the functional efficiency of the pancreas. The authors quote a number of instances in which the reaction could be caused to appear or disappear in the urine of hospital patients under treatment for such surgical complaints as hernia or fracture of bones, in whom there was presumably no disease of the pancreas. Thus one patient on a mixed diet of about 1800 calories gave a positive reaction when two-thirds of his diet, reckoned in calories, took the form of carbohydrate; another, when the carbohydrate reached 60 per cent., a third at 55 per cent., a fourth at 47 per cent. Each of these patients, when placed on a mixed diet with relatively less carbohydrate in it, failed to give Cammidge's reaction. The authors repeat their conclusion that a moderate amount of dextrinuria on an average mixed diet must be regarded as within the normal. They point out that the urinary dextrin can be determined by Benedict's method, which depends upon estimation of the reducing power of the urine both before and after boiling with hydrochloric acid, a process that breaks up the dextrin into reducing substances. They draw the provisional conclusion that if the difference between these two figures is 3·5 or less, the pancreas may be presumed to be normal.

[1] Nederl. Tijdschr. voor Geneesk., Amsterdam, 1916, i., 1260.

## PROCEDURE FOR INSURANCE COMMITTEES UNDER THE MEDICAL BENEFIT REGULATIONS.

IN order to secure the adoption of a suitable procedure by Insurance Committees in dealing with cases under the Medical Benefit Regulations in a judicial or semi-judicial capacity, the Insurance Commissioners issued recently a memorandum on the subject. The memorandum deals with the procedure to be followed in questions which stand referred to Medical Benefit Subcommittees under Article 45 of the Medical Benefit Regulations, 1913, which include those arising between an insured person and his panel practitioner, and those other questions which under the same regulation an Insurance Committee may refer to the Medical Benefit Subcommittee if it thinks fit; in questions under Article 40 of the Regulations of 1913 with regard to excessive prescribing—this procedure is applicable to cases relating to drugs and appliances ordered before January, 1916; in questions under Article 9 of the Regulations of 1916; to investigations, that is to say, relating to drugs ordered since 1915; and in questions arising under Article 50, which provides the machinery for the determination of questions as to whether in any particular case an operation or other service is of a kind which can consistently with the best interests of the patient be properly performed by a general practitioner of ordinary professional competence and skill. Uniformity of procedure and a correct understanding by committees and subcommittees of the points on which their inquiries should turn are, it need hardly be said, of considerable importance to the medical practitioners concerned.

## THE SOFTENING OF LARD.

A CERTAIN change in lard has been frequently noticed, but it has hitherto not attracted much attention in medical literature. This softening has already been described by Professor Brusaferro in a work on the "Hygiene of Meat," and he expresses there the opinion that the cause of the change was to be found in insufficient saltness, either because the necessary amount of salt had not been added or because the lard being kept in a damp place had lost salt. With the exception of loss of consistency lard thus changed seems normal, but its reaction is acid, whereas that of fresh lard is

neutral. But this acid reaction is not a special characteristic of softened lard, as it is observed in rancid or stale specimens, and in the latter is compatible with a good state of preservation. Many samples of softened lard are without any trace of rancidity, but the latter is an almost invariable concomitant in an advanced stage of the change. The great disparity of opinion in experts on the cause, the absolute silence on the question in treatises on hygiene and chemistry, and the necessity of investigating from a sanitary point of view any such change in an aliment of such importance have led Dr. C. Ninni and Dr. F. Russi, health officers to the municipality of Naples, to investigate the subject, and the results of their microscopical, bacteriological, and chemical researches are now published in a recent issue of the *Annali d'Igiene* (Rome, April 30th, No. 4). From these it appears that softened lard is characterised microscopically by the presence of a few connecting fibrils, organically by a marked diminution in consistency, and chemically by scantiness of non-fatty residue, water, and salt. Rancidity has nothing in common with the softening. The cause of the change is to be found in the presence of microbes belonging to the class of hyphomycetes associated with bacteria (Oospora lardaria and Micrococcus tetragenus) which, owing to insufficient saltness and special surroundings of temperature and moisture, develop proteolytic activity which is expended on the connecting tissue. From the point of view of nutritive value, softened lard is almost as efficient as stale lard in a good state of preservation, and from a hygienic point of view may be safely consumed provided it is not rancid, especially if cooked and therefore sterilised.

## MENINGOCOCCAL CONJUNCTIVITIS.

IN the *Medical Journal of Australia* of April 1st Dr. T. C. Ker and Dr. R. O. Douglas have described a rare manifestation of meningococcal infection—conjunctivitis. On Sept. 10th, 1915, a nurse on night duty in the meningococcal isolation block at the Bendigo Hospital "felt a strained feeling" in her right eye. Next morning the eye was sore, and there was a grating sensation under the lid. That night there was slight discharge, and on examination the conjunctiva was found to be red and engorged. Both lids were inflamed, and there was a profuse purulent discharge. Smears and cultures on glucose-agar were made from the lower fornix of the conjunctiva. The smears showed pus cells and many Gram-negative diplococci, both intra- and extra-cellular, larger than are usually seen in the cerebro-spinal fluid. The cultures gave a profuse growth of apparently typical meningococci. Naso-pharyngitis followed, but no swabs were taken from the throat. The temperature remained normal. The tarsal conjunctiva was painted with silver nitrate solution, 10 grains to the ounce, and the eye was irrigated with boric lotion every two hours. The question of giving a vaccine as a prophylactic against meningeal infection was discussed, but it was decided that the danger of the infection becoming generalised during a negative phase was too great. Antimeningococcal serum was not available. On the 12th the discharge was still profuse, but the pain had disappeared. On the 13th the left eye became affected and was treated with silver nitrate solution, and the discharge from it also was profuse. The patient complained of a very sore throat. On the 15th she was found to have lost her sense of smell, but the eyes were much better, the left not having reached such a severe stage of inflammation as the right. On the 17th the left eye was quite well and the right almost so. The patient got up on the 18th, and two days later was on duty. Though meningococcal conjunctivitis occurred in several of the cases of generalised infection with the meningococcus in the hospital, in none was it of such a fulminant type as in this case in which no general infection occurred. The meningococcal infection of the joints and the conjunctiva seemed to be of almost explosive rapidity, but recovery in every case was as rapid as the invasion.

## THE ANNUAL MEETING OF THE BRITISH DENTAL ASSOCIATION.

As we briefly noted last week, the British Dental Association is providing an attractive programme at its annual meeting, which is to be held in the hall of the Royal Society of Medicine, 1, Wimpole-street, W., on Thursday to Saturday next. The important subject of war injuries and gunshot fractures of the jaws and their treatment forms the chief subject of discussion, at which the coöperation of distinguished surgeons and dentists of our own and allied countries has been invited. The programme is as follows: On Thursday, June 15th, at 2.30 P.M., Early Treatment of Jaw Injuries. On Friday, June 16th, at 10.30 A.M., Appliances and Splints, the discussion to be opened by Mr. M. F. Hopson and Mr. J. E. Spiller; at 2.30 P.M., Restoration of Lost Portions of the Jaw by Surgical Means. On Saturday, June 17th, at 10.30 A.M., Treatment of Ununited Fracture and Mal-union, and Diet, Massage, and Dynamic Exercises, to be introduced by Mr. J. F. Colyer and Captain H. M. Holt, R.A.M.C., respectively. An introductory address will be given by the President (Mr. W. H. Dolamore) on Thursday afternoon. Those expected to participate in the discussions include Sir Frederic Eve, Sir F. M. Farmer, Captain H. D. Gillies, R.A.M.C., Captain Somerville Hastings, R.A.M.C., Mr. Norman G. Bennett, Mr. W. Hern, Mr. G. Northcroft, Mr. J. Lewin Payne, Mr. Percival P. Cole, and Mr. G. G. Campion, besides British, Canadian, French, Italian, and Belgian army dental surgeons. On Friday afternoon, June 16th, at 4.30, Lieutenant Derwent Wood, A.R.A., will demonstrate methods of making and casting masks for facial wounds which he is using at the Wandsworth War Hospital. Other demonstrations will be given by Mr. H. Baldwin and Mr. G. Brunton. An exhibition of appliances, splints, and models, has been arranged, and contributions are expected from war hospitals in this country and in the war zone.

## THE INDEX AND TITLE-PAGE TO THE LANCET: JANUARY TO JUNE, 1916.

IN view of the Government restrictions upon the supply of paper, and the shortage of paper quite apart from these restrictions, we cannot include, as usual, in all the copies of THE LANCET the Index and the title-page which are due at the end of this month. The Index and title-page will, of course, be prepared, and copies will be supplied gratis to subscribers on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such applications should please be sent in at once.

DONATIONS AND BEQUESTS.—By will the late Miss Annie Emily Pitman left £1000 to the Tunbridge Wells General Hospital.—Sir Edward Nicholl, of Cardiff, has given £10,000 to the King Edward VII. Hospital at Cardiff for the erection of a new wing.

# PREVENTION OF FLY-BREEDING IN HORSE-MANURE.

BY S. MONCKTON COPEMAN, M.D. CANTAB., F.R.C.P. LOND., F.R.S.,
LIEUTENANT-COLONEL, R.A.M.C. (T.); FORMERLY DIVISIONAL SANITARY OFFICER, 58TH (LONDON) DIVISION (T.F.).

DURING the summer of last year (1915) much difficulty was experienced in various military camps in regard to the removal of horse-manure at intervals sufficiently frequent to avoid the breeding of flies, the defective accomplishment of which sanitary precaution, apart from possibility of actual danger to health, having given rise to considerable discomfort to the troops. In certain hutted camps, more particularly, this "torment of flies" was aggravated owing to the unfortunate propinquity of horse-lines to kitchens and messes. Farmers were usually willing enough to receive the material, but even when contracts had been entered into between them and the military authorities for its removal it not infrequently came about that, owing to shortage of labour, of horses, and of carts, they found themselves unable to fulfil their contracts, especially during much of the period of greatest fly prevalence, when harvest operations were taxing their resources to their utmost. In some instances, in order to meet this difficulty, incineration of the manure, as advocated in a War Office Memorandum issued in April, 1915, had been attempted; but this method of disposal necessarily involved a waste of useful fertilising material, and indeed for this reason the official instructions as to destruction by burning have since been countermanded. An alternative method, consisting in the stacking of the manure and subsequently spraying or watering with a solution of borax, was also recommended.

### *Investigations by the United States Department of Agriculture.*

The use of borax was the outcome of experimental work, extending over a considerable period of time, reported in the official Bulletins (Nos. 118 and 245) issued by this department. The Commission entrusted with the work, while fully persuaded of the efficacy of this substance, if properly used, admitted that the dosage of borax to the extent of 0·62 lb. per 10 cubic feet of manure, necessary to effect the desired result as regards the destruction of fly larvæ, might render the manure injurious to vegetation. Consequently further investigations were instituted, special attention being directed to the possible utility of organic substances, of which they eventually decided that hellebore, either of the white or green variety, afforded the most promising results. An average of 12 experiments showed a larvicidal action of 95·5 per cent., and the substance, which produced no ill-effects on vegetation, was found to be completely decomposed within 30 days. Unfortunately, however, the cost was found to work out, in America, at double that of borax, while in this country it would probably be considerably higher. It hardly appears probable, therefore, that the use of hellebore will become at all general, especially on the large scale that would be necessitated in connexion with military services, as the expense would constitute even more of an objection than in the case of borax.

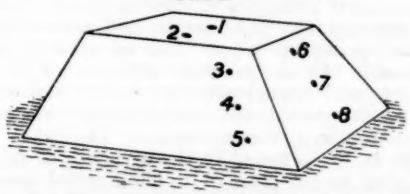
Apart from this aspect of the question, the work, though of much interest, cannot be regarded as altogether satisfactory from the practical point of view, as, indeed, is recognised in the published reports. Thus, reference is made to the "artificial conditions of cage experiments"; and to the difficulty in obtaining small samples of material for examination that could be regarded as representative, especially in view of the fact that no attempt was made to pack the manure. Moreover, the size of the experimental heaps, never apparently exceeding 40 cubic feet (32 bushels), was insufficient to afford reliable evidence as to the effects likely to be produced when dealing with large quantities of manure.

### *The Method of "Close-Packing."*

Under these circumstances it was decided to institute a re-investigation of the question on the larger scale rendered possible by the enormous amount of material available in the area occupied by the 58th (London) Division. Professor Maxwell Lefroy kindly afforded valuable suggestions as to the methods of testing certain substances which, in his opinion, were likely to prove serviceable as larvicides; but further collaboration in the work, which he had kindly promised, was unfortunately prevented by his recall to official duties in India.

The work was commenced early in June, 1915, with two carefully prepared, well-packed heaps of manure, each of a capacity of approximately 500 cubic feet, the area covered by each heap being 10 feet square, and the height being rather more than 5 feet to allow for the slight slope, inwards and upwards, of the sides. One of these heaps was kept as a control, while the other was treated by Professor Lefroy, who was present on this occasion, by pouring one gallon of tetra-chlor-ethane into a slight depression on the upper surface of the heap, with the object of obtaining information as to the effect of this substance on fly larvæ. A number (eight in all) of tiny packets of wire gauze, each containing 12 maggots, were inserted into the heap to a depth of about four inches, at the various points shown in the diagram. (Fig. 1.) To each gauze cage was attached a length of red

FIG. 1.




Heap of manure of approximately 500 cubic feet content, with a base of 10 feet square and a height of a little over 5 feet. The numbers denote the positions of the wire gauze cages each of which contained 12 maggots. (The sloping in of the sides of the heap has been exaggerated in the drawing.)

tape by which its position was indicated when the surface was again smoothed down, and in each cage also were placed a few particles of food material. Twenty-four hours later the gauze cages were removed, when all the contained maggots were found to be dead, shrivelled, and dark grey in colour.

This, of course, at first sight appeared eminently satisfactory, but the result of a similar experiment carried out on the control heap showed the necessity for caution in interpretation. For when the second stack was tested with larvæ in similar fashion, but without having undergone chemical treatment of any kind, again after 24 hours the larvæ were found to be dead at seven out of the eight places at which they were inserted, the exception being at the extreme top of the experimental stack. A third experiment was then put in hand with this stack, and yet, again, after 24 hours *all* the larvæ were dead, including those at the one spot at which this had not previously been the case.

I at once wrote to Professor Lefroy, informing him of what had happened and suggesting that in view of the unexpected results that had been obtained, apparently resulting from the heat generated by the process of fermentation in the newly-made manure heaps, it would be desirable, if suitable thermometers could be obtained, to record the precise temperature developed at various levels in the experimental stacks. A number of further manure heaps were subsequently constructed, and as the result of careful observations it soon became evident that the temperatures developed during fermentation largely depended on the manner in which the manure was stacked during the building of the heap. The manure, of which under service conditions we had an abundant supply, was brought in barrows from the horse-lines and stables and thrown on to an area of concrete or of hard ground, so marked out beforehand that the dimensions of the resulting pile are from 300–500 cubic feet. But there is, of course, no difficulty in extending the pile indefinitely in any lateral direction if necessary. It is well, however, not to exceed a height of 5 feet, as otherwise difficulty would be experienced in the building process. Each load as it is thrown on is firmly pressed down with shovels and slightly sprinkled with water if the weather is dry. The slightly sloping sides are finally beaten and smoothed over with a shovel.

Some of our experimental heaps have been examined daily for over two months, and sections from the top, sides, and base removed from time to time and carefully examined for eggs, larvæ, or pupæ of the house-fly. But, with one exception, none have been found so far, although house-flies at certain periods have been breeding in the manure

elsewhere in swarms. The one exception was in the case of a heap of somewhat smaller size than usual which, on being broken down, was found not to have been properly packed at the point where about a score of larvæ and pupæ were found. That this was likely to be the case had been indicated by the fact that the thermometer had shown persistently lower temperatures at the particular area in question than elsewhere in the heap, or in any of the neighbouring heaps.

When fermentation has ceased the inside of the heaps is found to be, for the most part, of a greyish colour, and more or less powdery in consistence. This material has a slight and not unpleasant odour somewhat similar to that of brewers' yeast.

### *The Temperature Lethal for Larvæ of the House-fly (Musca Domestica).*

In order to arrive at any accurate estimation as to the value of the method of treatment of horse-manure advocated with the object of preventing the breeding of house-flies, it was obviously essential to obtain experimental information as to the minimum temperature, exposure to which for a limited period, is incompatible with continued existence of the larvæ of the fly. As unfortunately no definite information on the subject appeared to be available, Professor F. M. Howlett, entomologist to the Indian Government, who is at present in this country on leave, kindly undertook, at my request, experimental investigation of the subject. As the outcome of his inquiry he informs me that maggots are quickly killed by either dry or wet heat (i.e., submerged in warm water) at any temperature above 46° C. (114·8° F.). He adds: "It is improbable that they could live long at anything over 41° C. (about 106° F.)"

Results of his experiments carried out at different temperatures are as follows:—

| Temperature to which exposed (degrees Centigrade). | Period of exposure which proved fatal to fly larvæ (in minutes). | |
|---|---|---|
| | Dry. | Wet. |
| 50° | 2½ | ¾ |
| 48°–49° | 8 | 2 |
| 46°–47° | 21 | 2½ |
| 44°–45° | 180 | 7 |
| 42°–43° | — | 12½ |

Temperature of air, 16° C. (nearly 61° F.).

With the exception of certain observations by M. Roux, referred to in a later paragraph of this paper, the only previous experimental work as to the temperatures lethal for insects with which I was acquainted is that of Mr. Bacot, and of previous observers quoted by him in his paper on The Temperature Necessary for the Destruction of Lice and their Eggs.[1] While he confirmed certain experiments by Blacklock (1912) which indicated that bugs (*Cimex lectularius*) die at 113° F. (45° C.), he further determined the fact that fleas (*Xenopsylla cheopis*) and cockroaches (*Periplaneta americana*) are also destroyed at this temperature or a few degrees higher. Mr. Bacot refers, moreover, to experimental work performed under the auspices of the Yellow Fever Commission (West Africa) as demonstrating that about the same degree of heat is also critical for mosquitoes (*Stegomyia fasciata*).

Quite recently, in reply to a letter from me informing him of our results, Dr. Gordon Hewitt, Dominion Entomologist for Canada, referred me to certain observations of his in a paper published in 1914,[2] from which the following paragraphs may be quoted:—

The heating of freshly piled manure is a matter of common knowledge and observation, but I have not seen any reference to its relation to the breeding of house-flies beyond the general statement that the higher temperature accelerated the development which my own experiments, carried out some years ago under controlled incubator conditions, demonstrated. Newstead found that at 100° F. the larvæ were uncomfortable and left the manure. In incubator experiments I found that a temperature of 104° F. was too great for the larvæ, and anything above that roasted them alive.

[1] Brit. Med. Jour., Jan. 29th, 1916.

[2] Further Observations on the Breeding Habits and Control of the House-fly, *Musca domestica*, Journal of Economic Entomology, vol. vii., No. 3, 1914.

If we examine the temperature of a pile of manure taken at a time when it is fresh, attractive to flies, and inhabited by larvæ, the results are somewhat surprising and significant. The following are the temperatures which were taken in connexion with two of the experiments:—

| | 11 (1). | 11 (4). | 11 (5). |
|---|---|---|---|
| Date | Aug. 8th. | Aug. 9th. | Aug. 15th. |
| Length of time manure exposed | 3 days. | 2 days. | 2 days. |
| Atmospheric conditions | Sunny, cool wind. | Oppressive, alternately sunny. | Oppressive, sunny alternately. |
| Air temperature | 86° F. | 78° F. | 103° F. |
| Temperature on surface of manure | 97° F. | 87° F. | — |
| Temperature 1 in. below surface | — | 106° F. | — |
| Temperature 4 in. ,, | 156° F. | 145° F. | — |
| Temperature 6 in. ,, | 158° F. | — | — |
| Temperature 10 in. ,, | 164° F. | — | 160° F. |

From the above temperature records it will be seen that at no great depth from the surface of the manure piles the heat was too great to permit the existence of the larvæ, and this fact was supported by observation. On the top of the pile the larvæ were only living in the surface layer, that is, the habitat was *peripheral*, and the excessive heat due to fermentation becomes practically a larvicide.

These observations are of special interest in view of the fact that the work of Dr. Hewitt, as in the case of the United States Commission, was carried out with manure heaps of comparatively small bulk.

### *Temperature Observations.*

Temperatures were taken daily about 12 noon with a long, tubular, widely calibrated, and Kew-certificated thermometer, on all four sides of each manure stack, and, in our later experiments, at three different levels on each side—at the

FIG 2.

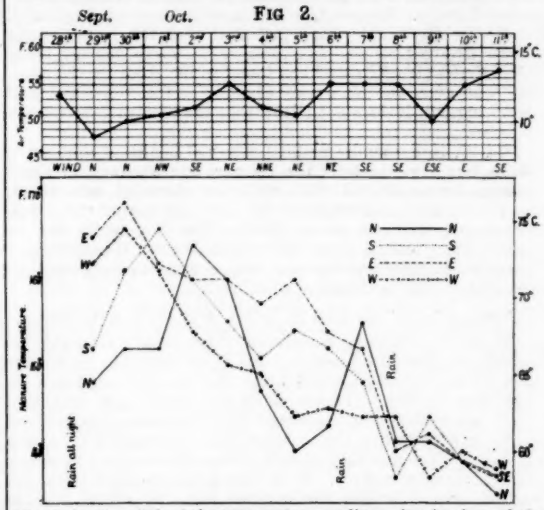



Chart showing (below) the temperature readings, day by day, of the manure-heap taken simultaneously at 12 noon on all four sides (N., S., E., and W.) of the heap. On each side readings at three different levels were taken, but only the lowest are here recorded. The bulb of the thermometer was always placed 4 inches below the surface. Above is shown the temperature of the air during the same period, and between the charts the direction of the wind. This manure-heap was built up on Sept. 28th.

centre, and at about 6 inches from the top and bottom respectively. Observations were also occasionally taken on the upper surface of the heap. As a matter of routine all temperatures were taken on each individual day as nearly simultaneously as possible. In order to ensure that the thermometer should be inserted at the same spot on each occasion, and in order to avoid necessity for using any force in its introduction, pieces of wood of approximately the same diameter as the thermometer, and rather less than a foot in length, were thrust into the sides of the heap, so soon as this was finished, at the various points at which temperature observations were subsequently to be taken. Each day when temperatures were taken these pieces of stick were removed one by one and the thermometer inserted. So soon as the temperature recorded remained steady the thermometer was removed and the piece of stick replaced, thus avoiding any appreciable loss of heat or any evaporation from beneath the surface of the pile. The temperatures recorded are those attained when the bulb of the thermometer was inserted about 4 inches beneath the surface.

For purposes of charting, the *lowest* temperature of the three taken at the different levels on each side of the heap was that which was recorded. As a general rule these temperatures varied within two or three degrees only on the same side, although occasionally a wider variation was observed. For purposes of comparison, daily record was also made of the temperature of the air, as also of the direction of the prevailing wind. The range of temperature observed in these experiments was considerable, and the upper limits reached were unexpectedly high, even in late autumn (169° F.) when the air temperature seldom reached and practically never exceeded 55° F. (See accompanying chart, Fig. 2.)

A preliminary report on results obtained in the prevention of fly-breeding in manure by means of the method described above was submitted at the Congress of the Royal Sanitary Institute, at Brighton on Sept. 2nd, 1915. Shortly afterwards there appeared in the *British Medical Journal*[3] a brief article entitled "The Natural Enemy of the Fly" dealing with a communication to the "Académie des Sciences" by M. Roux, Director of the Pasteur Institute in Paris (as I have since learnt, on behalf of M. E. Roubaud),[4] in which fermenting horse-dung is referred to in the words with which the abstract is headed. Unfortunately, however, I have had no opportunity of referring to the original paper. Roubaud states that the eggs of the house-fly cannot withstand a temperature of 60° C., whereas fresh horse-dung, if kept well covered up from the cold, quickly ferments, and during fermentation the temperature rises to between 60° and 70° C. Even the higher of these temperatures, however, has been considerably exceeded in several of our experimental heaps. Moreover, as will have been noted previously, Professor Howlett has demonstrated that the larvæ of the house-fly are destroyed at a temperature many degrees lower than that which Roubaud has found to be lethal for the eggs. So that even in the event of eggs being deposited and hatching out, it does not follow that the resulting larvæ will survive.

Dr. W. H. Symonds, medical officer of health of the city of Bath, has investigated[5] the temperature attained in small manure-heaps treated with different chemical substances, and in an untreated control heap. He states that "the temperature never rose above 70° C. (158° F.), while the air temperature varied from 42·8° to 75·3° F." When after an interval of two months the heaps were turned over he "could find no evidence of flies."

*Preparation of the Area on which Manure is to be Stored.*

If, as is probable, a concrete floor is not available on which to form the manure heap, it is desirable to prepare the surface of the ground after the manner suggested by Professor Lefroy. This is done by mixing one gallon of "oil, mineral-wood-preserving" with 40 gallons of pulverised earth and spreading the mixture on the ground and beating it down. The quantity mentioned is sufficient for 100 square feet of manure surface. It is desirable not only to treat the actual area on which the manure is to be stored, but, in addition, a space of about 3 to 4 feet beyond the site limits in order to prevent the possibility of larvæ (in the event of any being bred in the deposited manure) escaping when about to pupate and burying themselves in the adjoining ground—a migratory habit of the larvæ of *Musca domestica* under normal conditions, the nature of which has been investigated by Gordon Hewitt and other observers.[6]

In the event of the manure having to remain where deposited for any length of time, banking up the sides and covering the top of the heap with similar compost of earth and heavy oil would also be likely to be serviceable, if only in preventing the escape of volatile constituents of the manure, to which its fertilising properties are largely due. As regards the house-fly, a manure-heap appears no longer to possess any attractions when the process of fermentation is at an end.

*Effect of Close-packing on Fertilising Power of Manure.*

The question naturally arises as to the extent to which the agricultural value of the manure is diminished as the result of the high temperature developed when the heaps are close-packed in the manner advocated for the prevention of fly-breeding. The necessary time and opportunity for satisfactory experimental elucidation of this question have not been available. Thus far, the only test that has been carried out was made in October last with some boxes planted with mustard seed, and kept in a green-house to ensure a satisfactory temperature. Three boxes were employed for this purpose, which were filled respectively: (*a*) with sifted garden soil; (*b*) with sifted garden soil and well-rotted garden manure in equal parts; and (*c*) with sifted garden soil and material from the centre of one of the experimental manure-heaps in equal parts. On Oct. 24th, 1915, each of the three boxes was planted with approximately equal quantities of seed, and kept as regards exposure to light, temperature, watering, &c., under identical circumstances. When examined on Nov. 11th growth had occurred over the entire surface of the soil contained in each of the three boxes, but whereas no appreciable difference could be made out between the extent of growth in (*b*) and (*c*) respectively, in each of these the individual plants were taller, with leaves, stalks, and rootlets about twice as large as those grown in (*a*), the control box.

Although, obviously, no stress can be laid on the results of a single and somewhat primitive test of this kind, the result evidently affords some indication that material from the interior of our experimental manure-heaps possesses much, at any rate, of its original value as a fertilising agent, notwithstanding exposure to the high temperatures generated during fermentation.

[3] Brit. Med. Jour., Sept. 18th, 1915, p. 448.

[4] Comptes Rendus, No. 11, Sept. 13th, 1915. Translation in Journal of Royal Army Medical Corps, No. 1, January, 1916, vol. xxvi., p. 107.

[5] The Medical Officer, Sept. 25th, 1915, p. 138.

[6] H. C. Levy and W. T. Tuck: American Journal of Public Health, vol. iii., No. 7, pp. 657-660, 1913. R. H. Hutchison: Bulletin No. 14, U.S. Department of Agriculture, Washington, 1914. C. G. Hewitt: Canadian Entomologist, vol. xlvii, pp. 73-78, March, 1915.

## THE FOOD-SUPPLY OF THE GERMAN PEOPLE.

IN the preface to their little book, the first chapter of which we have already noticed,[1] Dr. Kuczynski and Dr. Zuntz quote a remark of the then Secretary of State, Delbrück: "In these hard times criticism is, to my mind, only justifiable when we can learn from the past what we have done wrong or left undone, and how to put it right in the future." The past has already been dealt with. In the second chapter the authors deal with the future, and their views, based on the prospects of the coming harvest, are summarised below. *It is necessary to remember that the views are those of the authors in all cases, and that repeating them here does not mean confidence in their accuracy.*

*The right division of food between man and beast.*—It was shown that at the beginning of the summer of 1915 only a partial control of supplies had been reached owing to the fact that during the first five months of war the measures taken in this connexion had been inadequate. Of far greater importance than petty household economies was the reduction in the number of beasts and the consequent saving of foodstuffs suitable for human consumption. The saving thus attained is an actual economy, in that such foodstuffs given to the animal, and eventually coming back to man in the form of meat, milk, and fat, are reduced by the amount required by the animal for the production of energy. If three or four million tons less of cereals had been used as fodder in the first few months of the war Germany would have had, according to these authors, ample for the needs of the population without such measures as the introduction of bread tickets. These facts, they say, must be considered in dealing with the coming harvest, while waste must not be sanctioned in the household, but above all the control of the entire food-supply is paramount, so that sufficient food may be assured to the people even in the case of a poor harvest.

With the limitation in the production of beasts will be associated a corresponding shortage in the supply of animal food which will entail the adoption of a more vegetarian diet, and it should be made common knowledge that such a change in diet will injure neither health nor working capacity if food substances in correct proportion and in digestible form are available. For example, instead of meat proteid milk may take the first place. It is true that the supply of milk also has been curtailed, but the reduction in the number of pigs will liberate a large quantity of skim-milk for human consumption. In the last year of peace the quantities of digestible proteid given to pigs in the form of milk were: In skim-milk, 175,800 tons; in butter-milk, 36,900 tons. By

[1] THE LANCET, Feb. 26th, 1916.

saving about half of this the lack of animal proteid may be kept well within the bounds of health.

The authors find the question a difficult one how far the breeding of the various beasts should be restricted. Pigs consume more of man's food than do other animals. It is only during the latter part of their growth and before fattening that they can be supported on green foods (clover and comfrey) and the products of the forest (nuts, mushrooms, worms, larvæ). For the period of fattening man's food becomes necessary. Just after the harvest, indeed, this food is available. Man can at most consume but one-half of the potato crop. The other half remains for fodder, along with the leavings of the cereal harvest (the damaged corn, and so on), and more important still the waste products of the sugar industry, and finally the household scraps. In estimating what future stores will be available the coming harvest must be considered, and we must reckon on a much lower average productiveness than that of last year, on account of (1) the lack of agricultural labour; (2) the scarcity of artificial manure (the use of which during the last 10 years has raised the productiveness of the land by at least 50 per cent.), particularly of nitrogenous manures which are the most important and of which 750,000 tons are lacking; (3) the reduction of area of land under cultivation to the extent of about a million hectares [2.47 million acres], owing to the lack of labourers and the fact that much of this land has been within the fighting area—e.g., in East Prussia and Alsace. It is possible that on this land summer crops may be raised, but the yield from them is never so great as from the winter crops. Thus for the second autumn of the war a considerable curtailment of supplies must be expected. The authors are, however, reassured by the remembrance that about three million tons of corn were used as fodder, 90,000 tons for distilleries, and 30,000 tons in starch factories, and that these amounts can be saved almost entirely for the food-supply.

In spite of the favourable outlook the authors recommend that the ration of bread should not be increased above about one-third, particularly in view of the liberal supply in autumn of fruit, vegetables, and potatoes. It is better, they think, to be in a position six months later to allow a more liberal ration, and for this reason the mixing of potato meal with the flour should be continued, with the precaution of using fresh potatoes from September to October onwards, so that the reserves of dried potatoes may be saved for the second half of the harvest year. This is an especially useful regulation in that fresh potatoes steadily lose in nutritive value through fouling, and also through the process of reproduction, while with the dried potato this is not the case. On this account it is also imperative that the potato-drying factories should be enlarged, and that sufficient supplies of potatoes shall be available for drying. In view of the comparatively perishable nature of potatoes a stocktaking must be made at the end of October at latest to ascertain what quantities are available for fodder, so that the whole quantity that can be spared should be used for fodder during the winter months to obtain the nourishment therefrom in meat and fat. It will then be found that in making accessible the sources of fodder-supply hitherto neglected the number of pigs can be materially increased. Since the beginning of the war it has been pointed out that the woods afford a supply of fodder for the rearing and fattening of a host of pigs. Records show that in the sixteenth century on 25,000 acres of oak-forest 9039 pigs were fattened—i.e., one pig on about two acres. But it is only in September and October and November, when the nuts fall, that the woods are so fruitful in fodder. The nuts, rich in proteid, serve for the initial stages of fattening, and as the full-grown animal requires little proteid the process can be completed by a diet of potatoes. In some cases it is advantageous for the women and children to gather the nuts, berries, and mushrooms for human consumption, especially the beech-nuts, from which much oil can be expressed in order to assist in meeting the shortage of fat, while the rest serves as a fodder rich in proteid. In one or other of these two ways, according to the labour available, the products of the forests should be turned to good account. Dried potatoes form a very useful fodder for horses. They are as well adapted for transport as corn, and combined with hay and straw will supply the needs of a horse engaged in hard work. Horses should be fed on fresh potatoes, hay, straw, molasses, and turnip scraps during the winter in cases where the work is only moderate, the corn being reserved for severe work and the dried potatoes for the latter part of the harvest year.

During the war the importance of sugar as a foodstuff has increased, but the authors consider that its production is likely to be curtailed in the next year by the shortage of labour and of manure. Indeed, 30 per cent. less land is under cultivation with sugar-beet this year than a year ago. If the yield is an average one the supply will not materially exceed the needs of the German people, and if it is a poor one it may even be inadequate. Thus, even if the frontiers are re-opened by the return of peace there will not be much sugar available for export, and on no account must as much sugar be used for fodder as during last year. The Government must step in to secure the population a sufficiency of sugar. It is no great matter that the increased cost of production and the curtailment of supplies should have somewhat raised the price, for sugar is still one of the cheapest foodstuffs in Germany. Until next harvest, however, no more sugar must be given to beasts, and molasses, too, must be used less for this purpose. The cattle will not suffer while green foods are again available.

It has been seen that the difficulties of regulating a food-supply which remains in the hands of the producers are very great, and to obviate these the law must be supported by a tariff of prices. To hinder the use of man's food as fodder the authors foresee that it will be necessary to fix a maximum price for meat, a price so adjusted to the maximum price of corn, flour, and potatoes that it pays the producer at least as well to sell these foods to customers as to use them as fodder. To prevent the immoderate use of barley, oats, and potatoes for pigs the following considerations must be borne in mind. For a pig to gain 100 kg. in weight enough fodder is required to supply 315 kg. of starch and 30 kg. of proteid—i.e., 440 kg. of barley, or 520 kg. of oats, or 1500 kg. of potatoes with 350 kg. skim milk. At M.200 a ton sufficient barley will cost M.88. Allow a quarter of this price for loss, then the attainment in a single pig of a gain in weight of 100 kg. will cost M.110. In checking the rise of meat prices the risk of serious hardship to the farmer must be avoided. It is necessary for him to obtain a higher price for his products as a whole, and particularly for grain and potatoes, than in time of peace, for only then is he in a position to carry out the proper regulations for the control of the cereal and fodder harvest. To assure to the population a sufficiently varied diet it is of great importance that large quantities of fruit and vegetables should be produced and preserved. For the latter sugar is required, and it is therefore imperative that the present shortage of sugar should be overcome, the deficiency being due not to lack of raw material, but partly to the increased difficulties in refining and partly to speculation. The safest method again is the fixing of a maximum price, which will effectually prevent speculation. Large production of jam and preserved fruits is essential, since the supply of fat is likely to steadily diminish.

In connexion with the restricted milk-supply, the appropriation of skim-milk to human consumption is, according to the authors, a desirable measure. The price of skim-milk must be raised so that milk vendors are not obliged to sell all their skim-milk to the farmers, and so to encourage its use in the towns. If this is done and the demand for skim-milk in the towns increases the farmers will suffer. At present the demand does in fact exceed the supply. In remote districts the skim-milk is not sent to the towns for sale, but is made into curd-cheese and the whey is used as fodder. As the farmer cannot estimate from day to day what supplies of skim-milk will be required, much might be wasted by a sudden drop in the demand. The sale of skim-milk therefore must be fixed by contracts extending over periods of months at least, and under the control of the German Agricultural Society. The perishable nature of skim-milk is not greater than that of full milk; it is indeed rather less, and its durability, though largely dependent on cleanliness, may be increased by heating to about 80° C. The skim-milk remaining over can be made into skim-cheese or condensed, and in the latter form is particularly useful in bakeries and in the household for the making of puddings.

*The finding of new fodder.*—The authors open their discussion of this important topic by saying:—We have seen that large supplies which were formerly used as fodder have now

been reserved for the food-supply of the people, and the deficiency in fodder thus caused must be made up (1) by more careful use of the available fodder; (2) by the use of other material hitherto neglected. It has been shown how the forests of leafy trees may supply nutriment for pigs and similarly they form a source of supply for cows. Efforts have already been made in times of scanty harvest to use this source of supply, but to no great extent. The comparative nutritive value of the various leaves is shown in the following table, giving the amount of proteid and starch obtained from 100 kg. of each raw material:—

| Species of fodder. | Digestive proteid. | Starch. |
|---|---|---|
| Elm leaves (young) ... ... ... ... | 11·7 kg. | 50·0 kg. |
| ,, ,, (old) ... ... ... ... ... | 9·7 ,, | 38·8 ,, |
| Acacia leaves ... ... ... ... ... | 23·6 ,, | 54·0 ,, |
| Horse-chestnut leaves ... ... ... | 11·3 ,, | 41·7 ,, |
| Poplar leaves in October... ... ... | 6·0 ,, | 26·7 ,, |
| Copper beech leaves in August ... | 0·9 ,, | 16·7 ,, |
| Vine leaves in autumn ... ... ... | 6·7 ,, | 42·5 ,, |
| Acacia brushwood in winter ... ... | 5·5 ,, | 12·6 ,, |
| Good meadow hay ... ... ... ... | 5·5 ,, | 31·8 ,, |
| Oat straw ... ... ... ... ... ... | 1·3 ,, | 17·4 ,, |

In order to make the best possible use of leaves it must be borne in mind that during the day the action of light draws considerable quantities of starch and sugar into the leaves, some of which returns during the night into the woody parts, so that the leaves are of the most nutritive value towards evening, when they should be gathered. Towards autumn the leaves grow less nutritious as well as less digestible, but, on the other hand, they contain less water and are more easily dried. They remain nevertheless useful as fodder until the end of November, as the analyses of Rissmüller have shown. Some leaves, such as oak, alder, &c., can only be used sparingly as fodder owing to their large tannin content. Those most suitable are: elm, acacia, horse-chestnut, poplar, ash, lime, maple, guelder rose, birch, fruit-tree leaves, and vine leaves. In drying, the leaves should be protected from rain and from direct sunshine, most easily done by drying them in the shade of the trees from which they were gathered. This use of leaves especially meets the case of the poorer people in town and country who keep one cow or a few goats. No harm results to the trees and bushes even if a second crop is gathered from them during the summer; the gardener himself normally removes many of the small leaves of the vine. Reckoning only with the use of the more accessible trees and bushes in hedgerow and by the wayside, the increase in fodder supply would amount to many tons.

Haberlandt is quoted by the authors as having revealed another source of supply in the woods—viz., the sap-wood of trees in early spring, with its high content of starch and fat. A complete method is still wanting for separating the nutriment from the cells in which it is contained, but short of this mechanical pulverising and chemical methods of separation have been efficacious in rendering these sources of nutriment available as fodder. To obtain nutritive material from straw and wood certain methods are available. The best-known method is that of the conversion of cellulose into sugar by boiling with acid under pressure, but this has the disadvantage of the presence of large quantities of harmful salts after neutralising the mineral acid. A more recent method is the use of organic acids which are in themselves of value as fodder—e.g., lactic acid. The significance of this method lies in the fact that not only is much cellulose converted into digestible carbohydrate, but the remaining nutriment in the cellulose coverings is exposed at the same time to the action of the digestive juices of the animal. Lehmann (Göttingen) had years ago made straw more nutritious because more digestible by heating it with a percentage of caustic soda under pressure. This method also results in the presence of organic acids which ruminants can digest. Kellner's method also, that of freeing the nutriment from its coverings by chemicals, resulted in a raising of the nuritive value of straw by 50 per cent. The straw thus treated was made appetising by the addition of molasses. Lastly there is the mechanical process of pulverising the fodder rich in cellulose. This method has two purposes—(1) to spare the animal much chewing and digesting; (2) by tearing the cellulose membranes to render them accessible to the digestive juices of the animal. Although of great use for the feeding of horses and pigs, Friedenthal showed that it needs complete pulverisation to open the cells, thus entailing great outlay of mechanical power and therewith great expense. The authors consider, therefore, that it is only practicable in the case of substances especially rich in nutriment, such as hay made from young green plants and the sap-wood of trees.

In the search for new fodders, heather, which covers large tracts of ground in north Germany, must not be overlooked, and as it contains very little water it is easy to dry. From ponds and water-courses water-weeds may be gathered and dried, and these form a very nutritious hay. Dwellers on the sea coast can increase their fodder-supply by collecting and drying seaweeds, avoiding those containing iodine which is poisonous. The most pressing question is to obtain a sufficiency of proteid for the milk-yielding animals. Formerly the deficiency was met by using the residue of the oil-industry, but that is now lacking. It must be replaced by the more careful production and use of fodder crops, such as vetches, lupins, serradella, and lucerne. This fodder must no longer be given to the working animals, but to those yielding milk and to the young growing cattle. The plants usually ploughed in as vegetable manure must in part be used to meet the deficiency. If these measures should not suffice use might be made of the method worked out by the Institute of Fermentation Industry for the extensive production of a yeast which is rich in proteid. A quick-growing yeast is cultivated in a sugar solution containing ammonia salts through which air is passed. As this method means a sacrifice of the sugar so necessary for man and beast the authors consider it as a last resort when lack of proteid is really hindering the full use of the available fodder.

Another means which the authors suggest of increasing the fodder supply is the avoidance of loss in the bringing in of the harvest and its storing. Of the highest importance in storing foodstuffs is the question of drying. The drying of turnip scraps and turnip leaves, of the leavings of the malt in beer-brewing, of the distiller's and other waste products from various industries has long been practised to a large extent, sometimes by means of gas, sometimes by steam-heating. There are, however, cheaper methods, such as the new patents by which the exhaust-steam from machinery in electric works and sugar factories can be turned to account. By this method of drying, potatoes can be kept from fouling, and turnip leaves, potato-tops, &c., converted into useful fodder. It is of great importance that the drying should be undertaken early after the next harvest, for if the season happens to be a wet one corn can be prevented from sprouting and the quality of the straw improved, while the hay crop can be increased by 20 per cent. or 30 per cent., by increased facilities for drying. The following table shows the percentage loss in nutrient material by the tardy drying of hay:—

| Time taken for drying. | Proteid. | Fat. | Nitrogen-free extractives. | Fibre. | Minera salts. |
|---|---|---|---|---|---|
| 10 days ... | 9·9 ... | 49·5 ... | 16·3 ... | 2·5 ... | 12·8 |
| 20 ,, ... | 45·8 ... | 72·9 ... | 46·6 ... | 27·7 ... | 48·6 |

In saving the hay from damage by rain the outlay in heating material (a few pence for 100 kg.) is more than compensated by the improved quality of the hay. In drying great quantities of hay and corn in bad weather large roofed-in spaces are best, and if space is precious the corn can be cut half-way down the stalk. By Loebel's method of drying at a comparatively low temperature the rendering of the straw indigestible is avoided. Hay that is dried in the open fields should not be left lying on the ground but raised on trestles, stretched wires, &c., so that it is better exposed to the sun, and drains free of water in case of rain.

The drying process is, in the authors' opinion, not only useful for fodder but also for foodstuffs, and should be adopted both in country and in town. In the household it can be done on the hearth, in the oven, or in the open air. Not only the usual fruits such as plums, apples, cherries, bilberries, &c., should be preserved by this means, but also potatoes, either raw in slices, or boiled in their skins and then mashed up. Further, in that drying factories cannot be built fast enough, pickling methods must be improved by the employment of the culture of bacilli. Even in the case of withered turnip-tops the Institute of Fermentation Industries at Berlin found that by placing them in large quantities in cemented pits and treating them with a culture of lactic acid loss by fermentation was considerably reduced.

*(To be concluded.)*

# PARIS.

(FROM OUR OWN CORRESPONDENT.)

*Trench-foot.*

Dr. Raymond and Dr. Parisot have presented to the Academy of Sciences (introduced by Dr. Laveran) a note on cold-bite of the feet. The authors conclude that the troubles observed in this affection are characteristic of a peripheral neuritis. Among the various etiological causes suggested they regard cold damp alone as the important factor, and have asked themselves by what mechanism this cosmic agent acts on the tissues. Thus they have been led to the conception of a local infection of the feet and to a search for the agent. A mould was isolated from the lesions and identified by Professor Vuillemin. Inoculation of pure cultures of this fungus into animals reproduces the typical lesions observed in man—œdema, phlyctenules, black eschars. The authors conclude that the affection is nothing else than a mycetoma of the feet comparable to Madura foot, and they propose to call it *pied de tranchée*. The fungus, which is commonly found in infected soil, straw, and manure, is brought into contact with the feet by the mud of the trench, and penetrates into the tissues by the matrices of the nails or through the excoriations so frequently present at points of friction. Almost all the men after a period in the trenches are carriers of these organisms. The local lowering of temperature resulting from standing in the water permits the implantation of the fungus, which shows its optimum development between 25° and 30° C. From these researches prophylaxis and therapy follow, based on the cleansing and disinfection of the feet by means of soaps and of alkaline, or preferably borated and camphorated, washes. The effects have been excellent: œdema disappears in four days and the neuralgic pain in 15 to 20 days.

*The Value of Ambrine in the Treatment of Wounds.*

Attention is being drawn to the remarkable success of the ambrine wax treatment now being used at the Hôpital St. Nicolas at Issy-les-Moulineaux for burns, frozen feet, and all wounds where the tissues have been so damaged as to exact great length of time and considerable disfigurement in their restitution by the usual means. The Minister of War, in reply to the question of the deputy M. Mons as to why, in view of the marvellous results obtained by treating burns and frost bites with paraffin wax at the Hôpital St. Nicolas, all the soldiers suffering from such wounds were not sent there, stated that this was being done as far as possible. By the kind permission of Dr. Burlureaux, the Médecin-Chef, Dr. Lancien, and Dr. Barthe de Sandfort, the discoverer of the treatment, I was allowed to visit the hospital on two different occasions and to see the application and its results. Faces badly burned with liquid tar and several cases of very badly affected frozen feet were being treated. The gangrenous toes had been removed and new skin was forming over the raw tissue. The treatment is simple and the method the same in every case. The liquid ambrine, a composition of paraffin and resin, heated to a temperature of 80° to 100° C., is applied in a thin layer with a sterilised paint-brush after the wound has been thoroughly syringed with plain boiled water. No antiseptic is used in ordinary cases. If there is much putrefaction dilute peroxide is used, but as soon as no odour is noticeable this is discontinued, one of the principles of the ambrine treatment being that antiseptics retard the formation of new tissues. The hot liquid congeals as soon as applied, forming a compress on the wound which retains its heat for a considerable time. A thin layer of absorbent cotton is added and also covered with a layer of liquid wax. The wound being now perfectly protected from infection from without the composition of the exterior dressing is immaterial and the amount used may be quite limited—a fact of importance in field hospitals where great numbers have to be dealt with and stores are scanty. The patients assured me they felt an extraordinary relief from pain as soon as the wax was applied. One man was admitted in great agony suffering from a face terribly burned from jets of burning liquid tar, and in half an hour was able to eat a meal in comfort. The dressing is renewed every 24 hours for the first few days, and then is only changed every second day. The removal shows another advantage of Dr. Barthe de Sandfort's treatment. The wax peels off like a glove, neither sticking to the tissues nor producing capillary bleeding. The patient does not feel the slightest pain at any time during the dressing, and as there is absolutely no disturbance of the wound the growth of new tissues is not retarded. The advantages of ambrine over other dressings may be briefly summarised thus: (1) Saving in time and money, as the impervious wax coating makes it unnecessary to have specially prepared antiseptic dressings; (2) facility with which the dressing may be peeled off; (3) time required for healing is much shortened; (4) antiseptic lotions need not be used; (5) immediate relief of pain; (6) protection to the wounds from variation in temperature and mechanical injury during transport; (7) avoidance of cicatricial tissue, the skin formed more closely resembling the normal than in treatment by other means.

*A Serum against Typhus.*

Dr. Charles Nicolle and Dr. Blaizot have undertaken some interesting experiments at the hospital of Sidi Abdallah, near Bizerte, on the action of an anti-typhus serum which they have prepared. This serum has shown a definite protective action in the guinea-pig, which after injection has constantly proved refractory to the strongest inoculations of virus. The monkey and the guinea-pig, after simultaneous intraperitoneal injections of virus and serum, remained immune, whilst control animals rapidly succumbed to the disease. Curative action is exercised only when the serum is employed on the day of inoculation of virus or the two following days. The serum having been shown to be innocuous, Dr. Nicolle and Dr. Blaizot have applied it in 19 cases of typhus in native soldiers or Serbs. In all cases where the injection was given at the onset immediate remission of the symptoms was obtained, defervescence occurring in the following 24 or 48 hours, and the improvement progressing to recovery. Each injection is constantly followed by a fall in temperature. Fourteen patients who were treated from the first appearance of symptoms recovered, whilst all the patients admitted with the disease fully developed died. Before the employment of serum at the hospital case mortality of the typhus patients was very high. The serum is obtained in the following manner. As the microbe of typhus is not visible the virus is cultivated by successive inoculations into the guinea-pig, an animal very susceptible to the infection and in which the virulence of the infection persists undiminished throughout the series. The authors prepare an emulsion of the spleen and suprarenals of the animals thus infected, and this emulsion is then inoculated into a horse or donkey. The donkey which has furnished the serum employed in these researches has received in 11 months 105 virulent inoculations, and was bled after the thirtieth, the sixtieth, and the eightieth of these. The serum has given rise to no toxic or other untoward effect in man. The most favourable dose seems to be 10 c.c. a day.

*Diagnosis of Typhus: the Sign of the Tongue.*

A medical man with a large experience of typhus through long observations in Morocco, Dr. Remlinger, has described what he terms the "sign of the tongue." This he has observed especially at Tangier, and it is essentially as follows. When a patient with typhoid or paratyphoid is asked to show his tongue he obeys without difficulty, and the tongue can be drawn forward for adequate inspection. But the same request addressed to a typhus patient has a different result. He cannot do so, or only partially and after great effort. The movements of the tongue are not well under his control. The greatest difficulty is experienced in protruding it, and to do so beyond the dental arches is a matter of impossibility. Often even the tongue is retained within the roof of the mouth, and appears drawn towards the pharynx. Contracture of the genio-glossus is suggested. Sometimes a slight trismus is produced at the same time, provoked by contracture of the masseters, which tends to increase the difficulty in protruding the tongue beyond the dental arches, as these are less widely opened. Special difficulty in speaking, nearly comparable in intensity to that present in tetanus, arises from the conditions described. The sign is of service in the differential diagnosis of typhus from typhoid and paratyphoid.

*Prophylaxis and Treatment of Cholera.*

Before the Medical Society of the Hospitals M. Cawadias endeavoured to draw lessons from the cholera epidemic in the Greek army during the last Balkan War. He showed in the first place the importance in this epidemic of contagion from man to man. In prophylaxis anticholera vaccination has given remarkable results. In his hospital at Strumnitza the author found among his patients that 82·5 per cent. had not been vaccinated at all, 10·6 per cent. incompletely (a single injection of the vaccine of Kolle), and only 6·7 per cent. completely. The mortality at Strumnitza was 21 per cent. for the non-vaccinated and 2 per cent. for the vaccinated. The treatment found the most efficacious was intravenous injection of physiologic serum. Although very effective, vaccination gives results in cholera less complete than in typhoid. Thus it is still needful to insist on the usual preventive measures of disinfection and isolation.

June 3rd.

## THE SERVICES.

### ROYAL NAVY MEDICAL SERVICE.

THE following appointments have been notified:—Fleet-Surgeon: J. P. H. Greenhalgh to *Victory*. Staff-Surgeons: T. W. Jeffery to *Pyramus*; E. R. Townsend to *Vulcan*; and P. T. Nicholls and R. Thompson to *Victory*. Temporary Surgeons: F. L. Cassidi to *Leander*; G. W. Carte to *Vivid*; E. R. Bailey to *Vengeance*; H. Danvers to *Attentive*; E. L. Sturdee to *Lion*; H. S. Ollerhead and W. F. R. Castle to Haslar Hospital; P. C. Gibson to Plymouth Hospital; and G. S. Mitchell to Chatham Hospital.

### ROYAL NAVAL VOLUNTEER RESERVE.

M. F. Hopson to be Dental Surgeon for temporary service.

### ARMY MEDICAL SERVICE.

To be temporary Colonels whilst Assistant Directors of Medical Services: Brevet-Colonel F. Smith, C.M.G., D.S.O., Lieutenant-Colonel J. Poe, D.S.O., Lieutenant-Colonel A. W. N. Bowen, and Lieutenant-Colonel R. J. Blackham, C.I.E.

### ROYAL ARMY MEDICAL CORPS.

Temporary Lieutenant-Colonel R. T. Leiper relinquishes his commission.

Temporary Captain H. W. M. Tims to be temporary Major.

The undermentioned to be temporary Captains: Temporary Lieutenant F. W. Milne, Captain G. H. Clark (Unattached List, T.F.), J. A. Turner, C.I.E., Temporary Lieutenant A. D. Forbes, and Temporary Lieutenant A. W. Owen.

Temporary Captain R. B. Llewellyn relinquishes his commission.

The undermentioned temporary Lieutenants relinquish their commissions: E. Robertson, W. F. S. Yeates, H. W. Ward, A. H. Melville, W. C. Marsden, C. G. McAdam, H. A. C. Wall, R. W. Richards, R. B. Minnett, and R. P. Thomson.

The undermentioned temporary Honorary Lieutenants to be temporary Lieutenants: J. G. Jones, V. C. James, N. M. Cummins, L. G. Jacob, R. H. Fleming, R. G. Michelmore, T. T. B. Watson, and W. D. Newcomb.

The undermentioned to be temporary Lieutenants: S. H. Calneck, A. T. Thurston, J. J. Shannon, A. P. MacMahon, A. Morton, T. S. Paterson, W. J. Poole, W. M. Stewart, J. L. Torley, R. Lindsay, J. W. Macfarlane, D. McLaren, F. R. Martin, W. W. Morrison, D. H. Coats, W. K. Connell, A. S. Cook, W. D. Allan, T. H. V. King, P. G. Foulkes, S. G. Harrison, N. H. Smith, H. H. Lawrence, J. A. Tobin, R. G. Gillies, R. H. C. O. Wisdom, A. A. Greenwood, G. Fehrson, W. B. Knobel, P. S. Marshall, G. T. Garraway, J. P. Pegum, W. J. Moir, and A. N. Haworth.

The undermentioned to be temporary Honorary Lieutenants: R. H. Maingot and H. G. E. Williams.

Temporary Lieutenant Michael Sorokiewich relinquishes his commission.

Canadian Army Medical Corps: The undermentioned to be temporary Captains: Lieutenant C. E. Hanna, G. F. Seaborn, H. G. Gillissie (from 62nd Canadian Infantry Battalion), and V. Bourgeault. The undermentioned Lieutenants to be temporary Lieutenants: J. W. Evans, M. A. MacKinnon, and R. Stipe.

### SPECIAL RESERVE OF OFFICERS.

*Royal Army Medical Corps.*

Lieutenant (on probation) G. Irving is confirmed in his rank.

### TERRITORIAL FORCE.

*Royal Army Medical Corps.*

South Midland Mounted Brigade Field Ambulance: Captain A. Leggat to be temporary Major whilst commanding a Field Ambulance.

East Anglian Field Ambulance: Lieutenants E. J. Staddon and R. J. R. Mecredy to be Captains. N. R. Williamson to be Lieutenant.

Highland Field Ambulance: Majors D. Rorie and A. E. Kidd to be temporary Lieutenant-Colonels whilst in command of a Field Ambulance.

East Lancs Field Ambulance: Captain F. C. Bentz relinquishes his commission on account of ill-health. Lieutenant C. W. Fort to be Captain.

London Casualty Clearing Station: J. C. Newman to be Lieutenant.

Wessex Division Sanitary Section: Lieutenant W. H. Biggs to be Captain.

Home Counties Field Ambulance: Captain G. W. C. Hollist, from a Casualty Clearing Station, to be Captain.

West Riding Field Ambulance: Lieutenant H. A. Beetham to be Captain.

West Lancs Field Ambulance: Lieutenant A. S. Parkinson, from a Lancs Field Ambulance, to be Lieutenant.

London Field Ambulance: Captain G. H. L. Whale, from a General Hospital, to be Captain

Welsh Field Ambulance: Major A. R. Wilson, from Attached to Units other than Medical Units, to be Major. Major A. R. Wilson to be Lieutenant-Colonel.

Northern General Hospital: The undermentioned Lieutenants to be Captains: F. Harvey and N. J. Wigran.

London Sanitary Company: Lieutenants H. J. L. Barefoot and B. R. Hebblethwaite to be Captains.

*Attached to Units other than Medical Units.*—Major J. Griffiths relinquishes his commission on account of ill-health.

## VITAL STATISTICS.

### HEALTH OF ENGLISH TOWNS.

IN the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census, 8316 births and 4163 deaths were registered during the week ended Saturday, June 3rd. The annual rate of mortality in these towns, which had declined from 17·0 to 12·5 per 1000 in the five preceding weeks, was again 12·5 per 1000 in the week under notice. During the first nine weeks of the current quarter the mean annual death-rate in these towns averaged 15·2, against 14·8 per 1000 in London. Among the several towns the death-rate during the week ranged from 3·6 in Smethwick, 5·1 in Enfield, 5·4 in Edmonton, 5·7 in Hornsey, and 6·8 in Southend-on-Sea, to 19·5 in Rotherham, 19·6 in Great Yarmouth, 21·0 in Middlesbrough, 22·0 in Halifax, and 23·3 in Bootle.

The 4163 deaths from all causes were 1 below the number in the previous week, and included 335 which were referred to the principal epidemic diseases, against numbers declining from 431 to 326 in the five preceding weeks. Of these 335 deaths, 125 resulted from whooping-cough, 104 from measles, 58 from infantile diarrhœal diseases, 32 from diphtheria, and 8 each from scarlet fever and enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 1·0 per 1000, and coincided with that recorded in the previous week. The deaths attributed to whooping-cough, which had been 125, 128, and 131 in the three preceding weeks, fell to 125, and included 33 in London, 13 in Manchester, 11 in Birmingham, 8 in Liverpool, and 6 in Newcastle-on-Tyne. The deaths referred to measles, which had been 124, 103, and 85 in the three preceding weeks, rose to 104, of which 26 were registered in London, 10 each in Liverpool, Manchester, and Sheffield, 5 each in West Ham and Stoke-on-Trent, and 4 each in Leeds, Gateshead, and Newcastle-on-Tyne. The fatal cases of diarrhœa and enteritis (among infants under 2 years), which had been 48, 62, and 53 in the three preceding weeks, rose to 58 and included 16 in London, 8 in Birmingham, and 4 in Leeds. The deaths attributed to diphtheria, which had declined from 65 to 34 in the seven preceding weeks, further fell to 32, of which 7 were recorded in London and 4 in Liverpool. The deaths referred to scarlet fever, which had been 18, 15, and 16 in the three preceding weeks, fell to 8, and included 2 in London. The 8 fatal cases of enteric fever included 2 in London, and were one in excess of the average in the earlier weeks of the quarter.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had steadily declined from 1778 to 1398 in the eight preceding weeks, further fell to 1343 on Saturday last; 163 new cases were admitted during the week, against 167, 139, and 161 in the three preceding weeks. These

hospitals also contained on Saturday last 1251 cases of diphtheria, 205 each of measles and whooping-cough, and 32 of enteric fever, but not one of small-pox. The 920 deaths from all causes in London were 46 fewer than in the previous week, and corresponded to an annual death-rate of 11·1 per 1000. The deaths referred to diseases of the respiratory system, which had declined from 405 to 128 in the 11 preceding weeks, further fell to 117 in the week under notice.

Of the 4163 deaths from all causes in the 96 towns, 159 resulted from violence, 288 were the subject of coroners' inquests, and 1235 occurred in public institutions. The causes of 29, or 0·7 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in London and in its 14 suburban districts, in Manchester, Sheffield, Leeds, Bristol, Bradford, and in 59 other smaller towns. Of the 29 uncertified causes, 4 each were registered in Birmingham and Liverpool, 3 in Gateshead, and 2 each in Southend-on-Sea, Preston, Rotherham, and South Shields.

### HEALTH OF SCOTCH TOWNS.

In the 16 largest Scotch towns with an aggregate population estimated at 2,372,000 persons at the middle of this year, 1143 births and 668 deaths were registered during the week ended Saturday, June 3rd. The annual rate of mortality in these towns, which had been 14·8, 15·0, and 14·4 per 1000 in the three preceding weeks, rose to 14·7 per 1000 in the week under notice. During the first nine weeks of the current quarter the mean annual death-rate in these towns averaged 16·4, against a corresponding rate of 15·2 per 1000 in the large English towns. Among the several towns the death-rate during the week ranged from 5·7 in Clydebank, 6·4 in Kirkcaldy, and 7·8 in Ayr, to 16·2 in Dundee, 17·4 in Greenock, and 20·0 in Hamilton.

The 668 deaths from all causes were 15 in excess of the number in the previous week, and included 54 which were referred to the principal epidemic diseases, against 53 and 66 in the two preceding weeks. Of these 54 deaths, 26 resulted from measles, 10 from whooping-cough, 7 from infantile diarrhœal diseases, 5 each from scarlet fever and diphtheria, and 1 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 1·2, against 1·0 per 1000 in the large English towns. The deaths attributed to measles, which had been 32, 25, and 34 in the three preceding weeks, fell to 26, and included 20 in Glasgow, and 2 each in Aberdeen and Leith. The deaths referred to whooping-cough, which had been 11, 17, and 9 in the three preceding weeks, numbered 10 of which 6 occurred in Glasgow. The fatal cases of diarrhœa and enteritis (among infants under 2 years), which had been 4, 4, and 10 in the three preceding weeks, fell to 7, and included 3 in Glasgow and 2 in Leith. The 5 deaths attributed to scarlet fever were 2 below the average in the earlier weeks of the quarter, and comprised 3 in Glasgow and 2 in Paisley. The deaths referred to diphtheria, which had been 5, 3, and 10 in the three preceding weeks, fell to 5, and included 4 in Glasgow and 1 in Dundee. The fatal case of enteric fever was registered in Glasgow.

The deaths referred to diseases of the respiratory system, which had been 103, 106, and 101 in the three preceding weeks, fell to 83 in the week under notice, and were 62 below the number registered in the corresponding week of last year. The deaths from violence numbered 34, against 19 and 18 in the two preceding weeks.

### HEALTH OF IRISH TOWNS.

In the registration area of Dublin 228 births and 151 deaths were registered during the week ended Saturday, June 3rd. The deaths corresponded to an annual death-rate of 19·3 per 1000, or excluding 10 deaths resulting from the recent disturbances to 18·0, against 11·1 in London and 15·5 in Glasgow.

Of the 151 deaths of all ages, 14 related to infants under 1 year and 33 to persons aged 65 years and upwards. The deaths referred to the principal epidemic diseases numbered 7, and comprised 3 from infantile diarrhœa and 2 each from measles and whooping-cough.

The causes of 11 deaths were uncertified, 4 others were the subject of coroners' inquests, and 65 occurred in public institutions.

During the same period 237 births and 124 deaths were registered in the city of Belfast. The deaths were equal to an annual rate of 16·0, against 16·6 per 1000 in the previous week, and included 11 of infants under 1 year and 27 of persons aged 65 years and upwards. The deaths from the principal epidemic diseases numbered 13, against 8 in the previous week, and comprised 6 from whooping-cough, 4 from measles, 2 from scarlet fever, and 1 from diphtheria.

The causes of 3 deaths were uncertified, 3 others were the subject of coroners' inquests, and 37 occurred in public institutions.

# Correspondence.

"Audi alteram partem."

## A SUGGESTED CLASSIFICATION OF PULMONARY TUBERCULOSIS.

*To the Editor of* THE LANCET.

SIR,—While the present time is not opportune for a full discussion of this important subject, a short criticism of the proposal of Dr. R. C. Wingfield, which appeared in your issue of May 20th, may be offered. The Turban-Gerhardt notation, so far as it goes, answers to one's experience, though it requires emendation; and in course of time, when agreement can be reached in an endeavour to express the more important factors which portray the acuteness of the disease and the amount of systemic disturbance, a satisfactory classification will be evolved. To ignore the Turban-Gerhardt classification because "it is not sufficiently definite" and to employ one which takes no account of the extent of the pathological process surely does not make for advance in scientific accuracy. The former includes in its "stages" a reference to certain physical signs which connote a pathological process, and it has not simply an anatomical basis. Inman's suggested "stages" may deserve the epithet "simple" applied to them by Dr. Wingfield, but have no claim to rank as a scientific classification, for they merely point to the degree of activity of the disease and give but a very poor indication of the extent of the ravages caused by the tubercle bacillus. The suggestion to add a letter A or D—indicative of the results of treatment—to the symbol of Inman's "stages" does not improve matters, because it does not give the assistance in classifying cases when they first come under treatment, which we should demand from our ideal classification. So far from Dr. Wingfield's notation being founded on "easily obtainable facts," his statement that "a case put under the heading $In_3D$ can only be one in which symptoms due to the large extent of his lesion cause unfitness to work," shows that it depends on a very broad inference, and an inference which takes no account of the many pitfalls which lie in the pathway of the tuberculous patient. A classification which leaves one to assume the extent of the pulmonary lesion is sadly wanting in completeness. Pending the publication of a scheme which will secure universal acceptance, I have personally adopted in the tuberculosis service of the West Riding of Yorkshire the headings of the Turban-Gerhardt notation, with a letter A, B, or C affixed to indicate the degree of activity of the disease and the amount of systemic disturbance, Class I. A including cases in an early stage, afebrile, with a moderate pulse-rate, and Class III. C those with advanced disease and running a rapid course, with considerable systemic disturbance. What is eventually desired is a classification which will be of international and not of parochial signification; and to secure such a standard we must avoid on the one hand too much elaboration, which would prevent easy tabulation, and on the other a too great simplicity, which would give an altogether insufficient representation of the important factors in cases of pulmonary tuberculosis.—I am, Sir, yours faithfully,

THOMPSON CAMPBELL, M.D.Glasg.,
Chief Tuberculosis Officer for the West Riding of Yorkshire.
County Hall, Wakefield, May 30th, 1916.

## LAND SETTLEMENT AFTER THE WAR: A COMMENT.

*To the Editor of* THE LANCET.

SIR,—The Final Report, Part I., of the Departmental Committee appointed to consider the scheme for settlement of discharged sailors and soldiers on the land after the war, discloses two proposed methods. One is the formation of "State Colonies" on tracts of land purchased for the purpose by the Board of Agriculture and Fisheries. The other is the encouragement, by all practicable means, of county councils to provide land for men who wish to settle in the neighbourhood from which they came and to which they are accustomed (par. 105), for this reason being averse from joining a "State Colony."

Long before the present war a Royal Commission obtained evidence that urban immigration is a potent cause of physical degeneration. "Back to the Land!" became a political catch-phrase, and glowing pictures were drawn by enthusiasts of the prompt recovery of our national physique that would ensue. Saner exponents of the movement have recognised that something more discriminating is needed than a simple exodus of our urban masses into the land to possess it. The social upheaval caused by the war and the prospective disbanding of hundreds of thousands of men at its close has encouraged the Government to inaugurate a scheme for the repeopling of depleted districts and the reconstitution of sturdy rural stocks by settling discharged soldiers in the projected "State Colonies," and for restraining rural emigration through extension of the land-purchasing powers of county councils.

But will the synthetic article compounded in these colonies prove equal to the natural product? Is the complex origin and evolution of our agricultural stocks understood?

The British people may be regarded as an amalgam of two elements, one native, the other intrusive. The native element is a branch of the small brunette long-headed race known as Iberian or Atlanto-Mediterranean. It probably settled in this country in early neolithic days. The traces of an earlier race, supposedly discernible, may be ignored for present purposes. The intrusive element is derived from various races which invaded the country in historic or late prehistoric times. Being evolved in regions differing somewhat in climate from the British Isles certain disabilities attach to their migration. For example, blonde types, such as derive from the Scandinavian or Anglo-Saxon, cannot live on a damp soil or thrive in urban life because the regions of their characterisation have mostly a sandy soil with relatively low rainfall, and they lived in villages of open formation.[1] The Jews thrive in cities owing to their long racial experience of urban life, but they are prone to catarrhs, &c., in North-West Europe because of their remoter evolution in South-West Asia. The snuffle of Whitechapel is unknown in the Italian ghettos. Analogous aptitudes and disabilities characterise other intrusive types and their derivatives.

The greater invasions ended with the Norman Conquest. After this the inhabitants of the British Isles, particularly in England, settled down to steadily developing agricultural pursuits. The result was the formation of innumerable small communities intermarrying little with one another. As century succeeded century these communities, by persistent inbreeding, became more and more specialised for local conditions of climate, food, and occupation, developing a close attachment to the soil on which they were bred. In these circumstances, whatever the original cross-breeding, certain strains ultimately became dominant, the others being eliminated. Subtypes developed, discernible at sight to those familiar with them, though presenting recognisable traits of the original race or races from which they were derived. The advent of the Industrial era, with the urban immigration it entailed, has shown that their local specialisation has made these folk bad migrants to alien environments. This holds good, however, not merely of urban immigration but also of rural redistribution. The fair-skinned peasantry of the Sussex Downs cannot live on the heavy clay of the Sussex Weald, nor can the little, brunette, long-headed folk of the Weald thrive on light soils, especially near the sea, but they do well on the London clay, Wealden servant-girls being highly esteemed in the London suburbs.

Similar phenomena are observable in other counties and districts. People of northern stock fail commonly to benefit from south-coast health-resorts. West-country folk feel "shrivelled up" on the east coast, and the east-coasters find their energy gone in the south or west. Those bred on the plateaus fare ill in the river valleys, and *vice versa*. The children are hit hardest because the immature organism is more sensitive than the adult to environmental influences. Testimony is readily forthcoming in many rural districts of the heavy incidence of disease on the newcomer, as compared with the native. These are the results of local specialisation in varied degree, and unless they are taken into account in endeavouring to reconstitute our virile but vanishing rural stocks there is danger of a fiasco comparable to Louis XII.'s experiment of the same kind. It is recorded that he uprooted certain peasant communities and planted them in the valley of the Durance, made desolate by the massacre of the Waldensians. To-day they present the most goitrous, cretinous, degenerate community in the whole range of the Alps.[2]

If the contentions here set forth are accepted, it follows that the fullest support should be given to that part of the Government scheme relating to county council settlements, because it encourages the development of already adjusted communities and keeps the stocks clear of inadaptable strains which might introduce degenerative influences. On the other hand, there would be an element of hazard in the formation of State Colonies, an element in any case substantial but varying in degree with the discrimination exercised in the selection of candidates. Ancestral derivation, as well as aptitude for agriculture, should be considered. The former, taken in conjunction with the candidate's physical type, might afford a valuable indication of the district to which he would be best suited.

Further facts and observations bearing on this subject may be found in the following:—

Harry Campbell, The Causation of Disease; Beddoe, Anthropology and Medicine; Allbutt's System of Medicine, vol. i.; Shrubsall, Physical Characters and Morbid Proclivities, St. Bartholomew's Hospital Reports, 1903; Sir William Bennett, Points Relating to Tuberculous Glands, *Practitioner*, June, 1910; Lieutenant-Colonel Woodruff, Medical Corps, U.S. Army, in his work, Tropical Light and Expansion of Races; and his papers, The Harmful Effects of Small Amounts of Heat and Light, *American Medicine*, vol. vii., The Eugenics of Migrants, *Eugenic Review*, January, 1911, vol. ii., No. 4; also, by the writer, articles in the *New Age*, June 1st, 1911, *School Hygiene*, September, 1911, *Clinic Journal*, August 9th, 1911, *British Medical Journal*, August 17th, 1912, and August 2nd, 1913.

I am, Sir, yours faithfully,

J. STEWART MACKINTOSH, M.D. Durh., &c.,
Fellow of the Royal Anthropological Institute.

## THE MEANING OF THE SO-CALLED REACTION OF DEGENERATION.

*To the Editor of* THE LANCET.

SIR,—In your issue of June 3rd there appears an article by Captain C. E. H. Milner on the function of the medullary nerve sheath. He quotes four cases of nerve injury: in the first he says that faradic response persisted for eight days after nerve severance; and in the remaining three that voluntary power returned long before reaction to faradism. I gather from his remarks that he considers these to be new observations—at any rate with regard to the return of voluntary power before faradic response. I can hardly think that the long-established fact that electrical reactions, as tested by the older methods, are practically unchanged for some days after nerve severance, was previously unknown to him.

The faradic coil is, in point of fact, the most unsuitable instrument imaginable for scientific testing. Various French writers, and in England the late Dr. Lewis Jones, have shown that, provided the body resistance remains constant, the vigour of muscular response depends upon the voltage used and upon the duration of each individual electrical impulse. To these factors must be added the *rate* at which the impulses are delivered, supposing them to be sufficiently frequent to produce a tetanising effect. Not a single one of these important factors is under control when using the ordinary medical coil, which therefore only permits of rough idea of the electrical excitability of the muscle. Galvanic testing as usually applied is almost equally inexact: for milliampèremeter readings, without standardisation of voltage, resistance, and size of pads, are valueless.

To provide a means of accurate testing Dr. Lewis Jones introduced his now well-known condenser apparatus, in which the voltage is fixed and the duration of each impulse known. The present writer has introduced a modification in which, should a tetanus be desired, the number of impulses per second is also under control. Tested by a Lewis Jones apparatus, a muscle whose motor nerve has been divided shows a steady increase in the length of impulse required to excite it almost from the first day, until after six or eight weeks the largest condensers (longest impulses) are required to cause movement, and what used to be called "the reaction of degeneration" is fully established. It used to be thought that, so long as this peculiar electrical response persisted, a muscle was, if not incapable of recovery, at least for the time being in a parlous state. Cases of its persistence after return of voluntary power were known, but were looked

[1] Vide Tacitus on the "Germans."

[2] See Whymper, Scrambles in the Alps.

on as rare exceptions. The experience of this war has shown the phenomenon to be by no means uncommon, so that a few months after an injury even the worst form of electrical response is not *in itself* of bad prognostic import. We often find that a muscle which has recovered some voluntary power, but not faradic reaction, nevertheless shows definite improvement when tested with the condenser instrument; but this is by no means always the case. Nevertheless, we may always be sure when we find that high condenser numbers are still required (old galvanic response), that *at some time in the past* there was complete blockage of all motor impulses, indicating a severe injury to a motor nerve. These points have been insisted on by the present writer in various papers, and failure to appreciate them is responsible for much of the criticism which has been levelled against electrc-diagnosis and prognosis. It will thus be seen that the so-called "reaction of degeneration" may occur in a muscle which has clinically recovered, and it would therefore be better to drop the term altogether, and to state simply the length of condenser impulse required to excite a muscle at a given voltage.

As to Captain Milner's argument concerning the electrical conducting powers of the medullary sheath, I am at a loss to follow it. A muscle will still respond to faradism (on short condenser impulses) when the nerve-endings are thrown out of action by curare; therefore, as is pointed out by Lewis Jones in his text-book of "Medical Electricity," the failure of response must be due to some change within the muscle, and cannot be dependent upon the condition of the sheath of the motor nerve. Whatever this change may be, it can obviously persist after voluntary power is re-established; and in this connexion it is interesting to note that voluntary movement is at first usually sluggish, and the contraction resembles that of unstriped muscle. There would appear to be scope here for pathological investigation.

The whole subject of electro-diagnosis and prognosis bristles with difficulties, and the path of the beginner is beset with gins and pitfalls. Nevertheless, it is a most fascinating branch of medicine, enabling those versed in it to prophesy with confidence and success. Any of your readers interested in the matter will find it discussed in detail in a paper which I read before the Section of Surgery, Royal Society of Medicine, and which was published in THE LANCET of Feb. 19th, 1916.

I am, Sir, yours faithfully,

FRANCIS HERNAMAN-JOHNSON.

Cavendish-square, W., June 3rd, 1916.

## ON THE ILL-TREATMENT OF GENITAL PROLAPSE.

*To the Editor of* THE LANCET.

SIR,—Dr. W. E. Fothergill gibes at ventrifixation and hysterectomy as operative measures in prolapse, and yet recommends as part of a curative procedure an equally futile measure—repair of the perineum. It takes no genius to discover the value of the perineum or the so-called perineal body in supporting the pelvic viscera. All one has to do is to pass one finger into the rectum and the thumb into the vagina, and to feel what is in the tissues between. To begin with, the so-called perineal body which is grasped in this way, and which in anatomical sections appears, and in diagrams is represented as, a wedge-shaped mass of tissue of some size, can be flattened quite easily from before backwards into a thin septum; and the only important structure in it is the ring sphincter of the anus, which can easily be felt. In the next place, the perineal body is found not infrequently completely ruptured, without any sign or symptom of prolapse, even when the tear was caused years ago and the patient has been living an active life. How rarely are patients who come for treatment for incontinence of fæces from this cause found to be suffering from prolapse? I have never seen a single one. Unfortunately, Dr. Fothergill appears ignorant of these facts or of their meaning; and thus it is not to be expected he can deduce from them the conclusion that repair of the perineum is of no value in the treatment of prolapse.

As regards the other measures recommended by Dr. Fothergill, experience has shown they are equally unreliable. He says "all can be set right" by plastic vaginal surgery. He makes no reference to the percentage of recurrences after such operations in his cases; his words suggest he has no recurrences. If so, he must indeed be happy; and he attributes none of his success to the invaluable concomitant of plastic vaginal surgery—rest in bed. Rest in bed, by itself, will cure some cases of prolapse; it will even cure them after the bases of the broad ligaments have been injected with quinine. Rest in bed and an easy time subsequently will work wonders—far greater wonders than any plastic vaginal surgery.

The reason the operative procedure in many cases of prolapse is so bad, and is so often followed by recurrence, is that the nature of the condition is not yet generally understood. Prolapse is of the nature of a hernia; it is a hernia of pelvic viscera through an opening in the muscular parietes, closing in the bony pelvic outlet (an outlet measuring roughly 4 in. by 5 in.), just as a protrusion in the inguinal, femoral, or umbilical regions of abdominal contents through the muscular parietes of the abdomen is a hernia. The content of the protrusion is of secondary importance; in prolapse the protrusion may consist of bladder, uterus or rectum, which as they come down invaginate the vagina, these various parts participating in different cases in different degrees according to their arrangement and the direction of the displacing force, just as an inguinal hernia may contain intestine, or omentum, or the gall-bladder or the ovary. And each condition arises in the same way: both are produced by strain—frequently repeated. In prolapse, strain causes whatever viscus is over the natural aperture in the pelvic parietes to "come down" through the natural aperture in the parietes, just as strain causes whatever viscus is against the natural aperture in the abdominal parietes to protrude. The protrusion occurs because the natural aperture is larger than normal, or because the striated muscle bounding it has become weaker, and so the aperture can be more easily dilated than normal. Prolapse often follows the resumption of active life soon after childbirth, because childbirth often causes extensive injury of the pelvic muscular parietes, and leads to permanent enlargement of the natural aperture in that parietes; but prolapse often appears for the first time years after childbirth, because the muscular parietes have not been sufficiently injured at childbirth and have remained strong enough for their work and only subsequently with advancing years have become weak.

Surgeons do not operate on hernia in people with weakened abdominal walls, because in such cases the hernia tends to recur, and often does recur, and success is unlikely; yet gynæcologists expect to cure prolapse in all cases. With too few exceptions they pay no attention to the muscular parietes of the pelvis, which, according to Dr. Fothergill, are vestigial in structure and tail-moving in origin. In the cases referred to surgeons advise a truss; they do not recommend a plastic operation on the skin and subcutaneous tissues covering the hernial protrusion or placed around it, or advocate plastic operations on the attachments of the viscera inside the abdomen, comparable to the plastic vaginal surgery performed for prolapse. They do not, for instance, shorten mesenteries—although in hernia the mesenteries have become longer. Or, if they operate, they insert a large filigree over the hernial site; they do not, however, place this outside the muscular wall in the fat beneath the skin. They place it inside the muscular wall, between it and the peritoneum.

It is left for gynæcologists to recommend a plastic operation on the skin and superficial fascia, and on the viscera themselves inside the pelvis, to overcome a similar complaint. Dr. Fothergill may "repair the perineum," perform colporrhaphy, and with the same breath decry the use of pessaries. But pessaries are but filigrees in a different form, and they are placed in the same relative position as that used by McGavin in his abdominal operations. Truly, they are placed within the vagina, but they are placed in that part of the vagina which is within the pelvic cavity, which is above the pelvic floor—the pelvic muscular parietes—between the pelvic floor and superjacent visceral structures. The use of the pessary in many cases of prolapse is the finest, the best, and often the only efficacious treatment. This is not only the experience of ages and of present-day practitioners of medicine, including many real specialists; it is also the result of a searching theoretical and academic inquiry which will bear probing even to its foundations.

I am, Sir, yours faithfully,

Rugby, June 5th, 1916. R. H. PARAMORE, F.R.C.S. Eng.

## THE DESTRUCTION OF COCKROACHES.

*To the Editor of* THE LANCET.

SIR,—In the useful and suggestive article on the cockroach, by Dr. J. J. H. Holt, in THE LANCET of June 3rd, there are certain biological factors concerned in the subject of his researches that, if ignored, may lead to erroneous and harmful deductions. There is a wide difference between the application of inhalants and food poisons. If an insect is put in a glass-stoppered jar with an inhalant poison the effect is automatic, entirely independent of the inclination of the imprisoned animal, the rapidity of death being solely dependent on the toxic strength of the inhaled poison. Where a poison food is used its effect depends entirely on the willingness of the animal to eat it. Every biologist is familiar with the fact that almost all animals when first captured and placed in confinement refuse to eat. I have confined mature insects in a jar with their favourite food which they have completely ignored for days. (This is not the case with caterpillars, which readily feed and are easily bred.) An animal must breathe, but is not bound to eat, at least for a time, and, as Dr. Holt says, in the case of the cockroach it can live 76 days without food.

To take two examples which Dr. Holt gives in his table of experiments, the latter of them being of personal scientific interest to me. The lethal effects of all the volatile bodies, given in his first table, are all much more rapid than those of food poisons in the last table, placed in covered dishes or bottles with imprisoned insects. This gives no reliable time effect whatever, the only comparable time test being to use the remedy on cockroaches in their free natural habitats. I can cite a striking example of this in the use of one of the remedies Dr. Holt mentions. Some time back, after strong complaints by the Local Government Board as to a plague of cockroaches at a large Poor-law institution here, with many hundreds of inmates, I was consulted with a view to destroying the pests. After careful inspection of the place, I found that fumigation was out of the question, and that to prevent dead cockroaches becoming mixed in the food they must be allowed to retire to their hiding places before death. On these lines I worked until every cockroach in the place was *killed*. Their hiding places were easily discovered, and one notable example was a dark, well-ventilated chamber where they clustered on the walls in the usual serried ranks to the number of several thousands—a huge dark mass. The food poison, which had been spread usually only in the kitchen and bakeries, was put down in this special hiding place, and on my next visit within three days there was nothing but a heap of dead cockroaches. This was how Blattis, to which Dr. Holt refers, came into existence. Far from having any repellent effect on cockroaches, its whole influence is in its attractiveness, which is demonstrated by the avidity with which they devour it, and they never require a second dose. It is all a question of food, physiology, and habit of the insect dealt with, these requiring special study and research for each species. Quite different material had to be used in the case of a pest that infested the house of a medical friend who was unacquainted with the insect, which is popularly known as the "silver fish" (*Lepisma saccharina*), which was entirely killed off in 48 hours with a powdery food mixed with a non-volatile poison.

To stove dwellings and institutions, such as war hospitals, &c., is practically impossible, and though a remedy that leaves no dead insects lying about may not produce such dramatic effects as stoving, those who are acquainted with the life-history and reproduction of the cockroach know well that an exterminator that operates at once, and in a few hours produces death, with a cumulative effect due to the preservation of the poison in the chitinous covered bodies of cannibalistic cockroaches, is a far more effective exterminator. My official position brings me numerous inquiries from many sources about insect pests, which are all carefully studied out and remedies adopted on the lines indicated.—I am, Sir, yours faithfully,

Museum, Sheffield, June 5th, 1916. E. HOWARTH, F.Z.S.

*To the Editor of* THE LANCET.

SIR,—With reference to the paper on this subject in THE LANCET of to-day's date I may say that my experience of Dalmatian insect powder on cockroaches is quite different from Dr. J. J. H. Holt's. The cockroaches appeared in a newly built house in large numbers, so I tried putting down insect powder along the floor near the walls. The next morning dozens were found nearly dead, quite unable to run, and it was a simple matter to sweep them up and burn them. After a few days of this treatment they all vanished. It seemed to me that the cockroaches had been trying the effect of eating the insect powder, which they probably would not do if confined in a glass-stoppered bottle, such treatment being calculated to take away their appetite.

I am, Sir, yours faithfully,

G. BURTON-BROWN, M.D.
Sidmouth, June 3rd, 1916. Surgeon, R.N. (retired).

## SIR WILLIAM JENNER'S DISCOVERY OF THE IDENTITY OF TYPHOID FEVER.

*To the Editor of* THE LANCET.

SIR,—In Dr. R. O. Moon's Chadwick lecture on typhus fever, published in THE LANCET of June 3rd, there is an error. It was at the London Fever Hospital and not at the London Hospital that Jenner's researches established the non-identity of typhus and typhoid fevers.

I am, Sir, yours faithfully,

CHARLES R. BOX,
June 3rd, 1916. Physician to the London Fever Hospital.

# Obituary.

## CHARLES EDWARD FITZGERALD, M.D. DUB., F.R.C.P. IREL.,

HONORARY SURGEON-OCULIST IN ORDINARY TO THE KING IN IRELAND; FORMERLY PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS OF IRELAND.

THE death occurred in Dublin on May 27th, as we have already announced in THE LANCET, of Dr. Charles E. FitzGerald, formerly President of the Royal College of Physicians of Ireland, at the age of 73. Few of his professional friends had heard of his illness, so that the news of his death came to them as something of a shock.

Charles Edward FitzGerald was born in Dublin in 1843, his father being Baron F. A. FitzGerald of the Court of Exchequer in Ireland. He received his education in Trinity College, Dublin, where he took his degree in Arts in 1864, proceeding to the M.B. in 1868. In this year he went to Paris, where he studied especially ophthalmology under Galezowski. On returning to his native city he commenced practice as an ophthalmic surgeon, and he devoted himself to that branch of medicine up to the time of his death. His success was alike the result of his skill, high personal qualities, and appetite for work, the last being proved by the number of the appointments that he held. In 1873 he was appointed ophthalmic and aural surgeon to the House of Industry Hospitals; he held the post for ten years, and was subsequently consulting ophthalmic surgeon to the same institutions. He was for many years lecturer on ophthalmic surgery in the Carmichael School of Medicine, and from 1889 to his death professor of ophthalmic and aural surgery in the School of the Royal College of Surgeons in Ireland. In 1876 he was appointed surgeon-oculist in ordinary to the Queen in Ireland, and similar posts were given to him by her successors, King Edward and the present King. He was at one time surgeon to the National Eye and Ear Infirmary; when that institution was merged in the Royal Victoria Eye and Ear Hospital he retired from active hospital work. Having become a Fellow of the Royal College of Physicians in 1886, in 1912 he was elected President, and he held the office with much distinction for two years.

FitzGerald early in his professional life found himself in the enjoyment of a large practice, but although his ophthalmological work necessarily occupied most of his time he made thoroughly good use of his leisure when it was obtained. He was devoted to music, and cultivated generally his literary and artistic tastes. He travelled a good deal, visiting America frequently. He was much pleased with his unanimous election to the presidency of the Royal College of Physicians of Ireland in 1912, for by this time he had largely withdrawn from active interest in professional affairs. He devoted himself to the duties of the important office with

unexpected ardour. His retired life had made him almost a stranger to many of the Fellows, while even those who knew him were surprised at the practical ability which he brought to his new work. Elected on grounds of seniority and because of his position in practice, he showed himself a distinguished and dignified chairman, tactful in eliciting the opinions of others, quick in grasping the points of a problem, and thoroughly painstaking in seeking the right solution. His retirement was a matter of great regret to his colleagues, while FitzGerald, as a mark of his affection for the College, presented to the corporation a badge of office to be worn by subsequent Presidents.

Dr. FitzGerald was twice married. By his first marriage he leaves four sons. To them and to his widow we offer our sincere sympathy.

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## WALTER BROCK PARSONS, M.R.C.S., L.R.C.P. LOND.

WE regret to announce the death of Mr. Walter Brock Parsons, which occurred somewhat suddenly at West Southbourne, Hampshire, on June 3rd. For five years or more he had fought strenuously and uncomplainingly against the attacks of a tuberculous infection, which first manifested itself while he was acting in 1910 as a member of the staff of THE LANCET, and the sudden termination to his life belied hopes of permanent cure which had recently become good.

Walter Brock Parsons, the son of an Indian official, was born in 1875, and qualified in 1898 as M.R.C.S. Eng., L.R.C.P. Lond., from the medical school of St. Bartholomew's Hospital. His first appointment was that of resident assistant surgeon at the Western General Dispensary. Here he did much work in the special department for diseases of the eye under Dr. Lindsay Johnson. Later he served as house surgeon to the North-West London Hospital, and obtained in particular a large experience of children's diseases and of dermatology. He was then appointed resident medical officer at the Farringdon Dispensary, where the special departments for diseases of the nose, throat, and ear especially attracted him, and later he decided to accept the invitation of Mr. J. Jackson Clarke to assist him in his work at the City Orthopædic Hospital. He attended with Mr. Clarke regularly, being clinical assistant to the hospital until its extinction by amalgamation with other institutions in 1907, and for a prolonged period acting as a member of the surgical staff. In 1907 he became assistant in private practice to the late Mr. Noble Smith, who had been senior surgeon at the City Orthopædic Hospital, and for a short period after his death Parsons practised orthopædic surgery as a specialist. In 1910 he decided to relinquish his career as a consulting surgeon, and was appointed sub-editor of THE LANCET. In this capacity his wide clinical experience equipped him to be a capable judge of what was best in many departments of medicine, whilst his liberal outlook and high standards made him a valuable colleague. His breakdown in health, which occurred within a year of his joining the staff of THE LANCET, was very sudden, and for some months he believed that at the end of a protracted holiday he would be able to return to work. The disease, however, never lost its hold of him, though for different periods of varying duration he seemed to be escaping from its clutches.

We tender our respectful sympathies to his wife and children in their great loss.

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## DUNCAN MENZIES, M.A. ST. AND., M.B. EDIN.

Dr. Duncan Menzies, who died on May 28th as the result of a motor accident, was born in 1854, and was the eldest son of Mr. James Menzies of Carse, Appin, Perthshire. He received his early education in his native county, then took his degree in Arts at St. Andrews University, afterwards graduating in medicine at Edinburgh University in 1883. He came to England in 1884 and became a member of the Perthshire Association of London and also of the St. Andrews University Club and the Edinburgh University Club, London, in all of which he was keenly interested. He settled down to practise in the neighbourhood of Dorset-square, where he was well known and greatly esteemed. He was a reliable and painstaking physician, and his sympathetic disposition endeared him to a large circle of friends and patients, of whom there was a large attendance at the funeral service at St. Cyprian's.

He leaves a widow and four sons and one daughter to mourn their loss. His eldest son, at present in Salonika, is a graduate of London University and has a commission in the Royal Army Medical Corps. The three other sons are in the army, being in the Cameron Highlanders, the London Scottish, and an Officers Training Corps respectively.

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## CHARLES LENOX CUNNINGHAM, L.R.C.S. EDIN., L.S.A.

WE learn from a correspondent that Mr. Cunningham died suddenly on board ship on Feb. 17th on his way to South Africa. He was serving as a surgeon on the liner which afterwards grounded off Robben Island. He was formerly in practice for some years at Lower Umkomaas in Natal, where he was medical officer of health and where his advice on blackwater fever was frequently in demand. His experience of malaria he had gained in his earlier years on the West Coast of Africa and was partly gained by personal experience, as he had himself suffered from a severe form of malaria. Mr. Cunningham's career had been a varied one; for 23 years he served the Queensland Government in the emigration service, later he was medical officer of the Ashanti Goldfields Corporation, and he also took part in an Arctic expedition.

Mr. Cunningham was a special correspondent for THE LANCET in the Soudan, Ashanti, and South African campaigns, and the interesting descriptions which he sent us were often accompanied by sketches which, if they did not exhibit high artistic merit, at any rate showed much imaginative perception, and some of them were reproduced in our columns for their topical interest. In THE LANCET, vol. i., 1885, p. 863, "Our Correspondent's Experiences in the Soudan" are illustrated by a sketch of the redoubt and base hospital and of the entrance to the Sawakin harbour. Other sketches (vol. i., 1896, pp. 1028, 1029, 1173, and 1391) illustrate the Ashanti Expedition, and one of these shows the boat conveying Prince Henry of Battenberg to H.M.S. *Blonde*, the vessel on which he unfortunately died. Mr. Cunningham also reported on the Special Sanitary Commission of the British Emigration Service (vol. ii., 1888, p. 1041).

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THE LATE DR. EDWIN F. NELSON.—Dr. E. F. Nelson, who died on May 29th at his residence in Downpatrick, was the son of a Belfast clergyman, and studied medicine at Queen's College, Belfast. In 1866 he graduated M.D. of the old Queen's University of Ireland, and at different times held the posts of medical officer of Downpatrick Union Hospital and medical officer to the troops in Downpatrick. He was surgeon-major for 31 years in the 5th Battalion of the Royal Irish Rifles, from which he retired only in 1909. Of his three sons, one, a captain in the 3rd Brahmans, was killed in France last year, and two others are officers in the army.

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THE ORDER OF THE HOSPITAL OF ST. JOHN OF JERUSALEM IN ENGLAND.—The following have been appointed Knights of Grace in the Order: Surgeon-General T. P. Woodhouse, C.B., A.M.S.; Surgeon-General Sir Richard Havelock Charles, G.C.V.O., I.M.S.; and Lieutenant-Colonel P. F. O'Connor, C.B., I.M.S.; and Mrs. Ella G. A. Webb, M.D.R.U.I., has been appointed a Lady of Grace.

DR. STEEVENS' HOSPITAL.—Sir Arthur Chance, F.R.C.S.Irel., has been appointed as consulting surgeon to Dr. Steevens' Hospital, Dublin. During the early years of the hospital's existence the consulting surgeoncy was usually held by the surgeon-general to the forces in Ireland, who was, *ex-officio*, a governor of the hospital. Among the surgeons-general were included John Nichols (1730–67), William Ruxton (1767–83), Archibald Richardson (1784–87), George Stewart (1787–1814), Soloman Richards (1814–19), and Sir Phillip Crampton, Bart. (1819–58). Among others who have held the position are Samuel Croker-King, the first President of the Royal College of Surgeons in Ireland; Ralph Smith Obre, Samuel Wilmot, James William Cusack, Robert Moore Peile, Christopher Flemming, Samuel George Wilmot, William Colles, Sir George Hornidge Porter, Bart., Edward Hallaran Bennett, and Sir Charles Bent Ball, Bart.

# The War.

## THE CATASTROPHE TO LORD KITCHENER AND HIS STAFF.

IT is a veritable tragedy by which the country is suddenly deprived of the services of Lord Kitchener, who, with his staff, was drowned on June 5th last while starting on a special mission to Russia. But the catastrophe must be faced by us with the spirit which that great man who has gone from us always showed in adverse circumstances. Sadly will he be missed from our councils, for much remained to be done by him; but the part of his work which he actually accomplished—the raising of a gigantic citizen army in a country utterly unready for the social revolution implied—will stand to his eternal credit in the memory of a grateful country.

## THE CASUALTY LIST.

The following names of medical officers appear among the casualties announced since our last issue:—

*Killed.*

Lieutenant J. MacC. C. Johnston, R.A.M.C., attached to the Worcestershire Regiment, was educated at Edinburgh and St. Andrews Universities, qualifying in 1913, and held the post of resident surgeon at the Royal Infirmary, Dundee. He joined the R.A.M.C. in July, 1915.

Captain J. G. Mackenzie, Australian A.M.C., graduated in 1910 at the University of Glasgow, and was in practice at Victoria, Australia, before joining the Australian Expeditionary Force.

Fleet-Surgeon F. F. Lobb, R.N., H.M.S. *Queen Mary*, received his medical education at St. Mary's Hospital, London, and qualified in 1898. After holding house appointments at St. Mary's, the London Fever Hospital, and the Female Lock Hospital, London, he joined the Royal Navy, and in 1900, while surgeon of the *Thrush*, he assisted in the rescue in a heavy sea of 13 French Malagasy subjects from the uninhabited island of Europa. He took part in the Nigerian and in the Gambian expeditions, receiving the African medal and the Aro clasp.

Surgeon C. W. Lewis, R.N., H.M.S. *Queen Mary*, qualified M.B., Ch.B. at Edinburgh University in 1914.

Surgeon M. H. de J. Harper, R.N., H.M.S. *Queen Mary*, qualified M.B., B.S. Durham in 1914.

Fleet-Surgeon W. J. Bearblock, R.N., H.M.S. *Invincible*, was educated at Guy's Hospital, London, and qualified in 1887. He had held a house appointment at the Royal Albert Hospital, Devonport.

Surgeon C. O. H. Jones, R.N., H.M.S. *Invincible*, was educated at St. Thomas's Hospital, London, where he held a house appointment later, and qualified in 1915.

Surgeon G. Shorland, R.N., H.M.S. *Invincible*, was educated at Guy's Hospital, London, and qualified in 1901. Prior to joining the Navy recently he was medical officer to the Railway Clearing House at Euston-square, London.

Fleet-Surgeon H. L. Norris, R.N., H.M.S. *Indefatigable*, was educated at St. Thomas's Hospital, London, qualifying in 1898.

Surgeon S. Punch, R.N., H.M.S. *Indefatigable*, was educated at University College, Cork, qualifying in 1912.

Surgeon A. A. Morison, R.N., H.M.S. *Indefatigable*, qualified M.B., Ch.B. at Edinburgh University in 1910, and was in practice at Craiglea Drive, Edinburgh, before joining the Navy as a temporary surgeon. He was a well-known Scottish footballer, and was formerly resident surgeon at the Royal Maternity Hospital, Edinburgh, and assistant medical officer at the Brook Hospital of the Metropolitan Asylums Board.

Fleet-Surgeon F. A. Capps, R.N., H.M.S. *Defence*, received his qualifications at Edinburgh and Glasgow in 1890.

Surgeon F. W. T. Clemens, R.N., H.M.S. *Defence*, was educated at Bristol University, qualifying M.B., B.S. Lond. in 1913. Before joining the Navy he was in practice at Bath.

Surgeon G. M. Johnson, R.N., H.M.S. *Defence*, received his education at Oxford University and at the London Hospital, and qualified in 1908. He had held the appointment of house surgeon and house physician at the Radcliffe Infirmary, Oxford.

Fleet-Surgeon H. L. Geoghegan, R.N., H.M.S. *Black Prince*, was educated at Trinity College, Dublin, qualifying in 1898.

Surgeon T. M. Wood-Robinson, R.N., H.M.S. *Black Prince*, was educated at Middlesex Hospital, qualifying in 1914. He was in practice at Dovercourt before joining the Navy.

Surgeon J. S. D. McCormac, R.N., H.M.S. *Black Prince*, received his qualifications at Edinburgh and Glasgow in 1894, and after practising in Leicester was appointed anæsthetist at the Royal Dental Hospital, London.

Surgeon G. B. Moon, R.N., was educated at Birmingham and at Edinburgh Universities, qualifying in 1904, and gave up his position as assistant medical officer at the Kent County Asylum, Barming Heath, to join the Navy shortly after the outbreak of war.

Surgeon-Probationer J. E. MacIntyre, R.N.V.R., H.M.S. *Ardent*.

Surgeon-Probationer D. J. T. Oswald, R.N.V.R., H.M.S. *Nomad*.

Surgeon-Probationer A. Joe, R.N.V.R., H.M.S. *Nestor*.

Surgeon-Probationer R. Walker, R.N.V.R., H.M.S. *Shark*.

Surgeon-Probationer D. H. Ferris, R.N.V.R.

Surgeon-Probationer H. J. Dingle, R.N.V.R.

Surgeon-Probationer J. Hislop, R.N.V.R.

*Lost in H.M.S. Hampshire.*

Fleet-Surgeon P. G. Williams, R.N., was a student at St. Thomas's Hospital, London, and qualified in 1889.

Surgeon H. F. McNally was educated at Queen's University, Belfast, qualifying in 1915.

Surgeon H. G. Chaplin was a student at St. Thomas's Hospital, qualifying in 1914, and afterwards returning to Newfoundland.

*Died.*

Temporary Lieutenant G. S. Engineer, I.M.S.

Lieutenant H. R. Griffith, R.A.M.C., qualified in 1889, graduating at Dublin University, and died from heart failure at Press Heath Camp, Whitchurch.

*Died of Wounds.*

Lieutenant-Colonel A. W. Tanner, Canadian Army Medical Corps, graduated at the University of Toronto, 1899, and was in practice at Moosomin, Saskatchewan, before joining the Canadian Expeditionary Force.

Captain W. N. Watson, R.A.M.C., attached to the King's Own Scottish Borderers, graduated in 1913 at Edinburgh University, and joined the R.A.M.C. in December, 1914. He was awarded the Military Cross in connexion with the battle of Loos, and took a combatant commission in April last.

*Wounded.*

Staff-Surgeon B. R. Bickford, R.N.

Captain J. J. Jamieson, Canadian Army Medical Corps.

Captain J. A. Reid, Canadian Army Medical Corps.

*Believed to have been taken Prisoners at Kut-el-Amara.*

*R.A.M.C.*—Maj. E. V. Aylen; Maj. E. Bennett; Lt.-Col. H. O. B. Browne-Mason; Capt. A. S. Cane; Lt.-Col. J. Hennessy, C.B.; Capt. C. E. M. Jones, attached to the Hampshire Regt.; Capt. A. T. J. McCreery; Capt. R. K. Mallam; Capt. L. Murphy; Capt. T. E. Osmond, attached to the Norfolk Regt.; Lieut. F. T. Simpson, attached to the Dorset Regt.; and Capt. J. Startin, attached to the Oxford and Bucks Lt. Infantry.

*I.M.S.*—Capt. L. A. P. Anderson; Maj. S. Anderson; Capt. D. Arthur; Lt. N. K. Bal; Maj. C. H. Barber; Capt. R. C. Clifford; Temp. Lt. A. Y. Dabholcar; Capt. S. G. S. Haughton; Col. P. Hehir, C.B.; Capt. H. H. King; Capt. J. S. S. Martin; Lt. R. V. Martin; Capt. K. K. Mukerji; Capt. C. Newcomb; Maj. W. MacM. Pearson; Capt. M. L. Puri; Capt. F. H. Salisbury; Lt. W. C. Spackman; Temp. Lt. N. R. R. Ubhaya; and Capt. G. O. Western, Sub. Med. Dept.

## DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our list of those who have fallen during the war:—

Lieutenant J. MacC. C. Johnston, R.A.M.C., elder son of Dr. R. Johnston, of Nethergate, Dundee.

Captain J. C. C. Barnes, Border Regiment, youngest son of Lieutenant-Colonel H. J. Barnes, R.A.M.C., of Colyton, Devon.

Lieutenant H. C. N. Taylor, London Regiment, younger son of Dr. F. Taylor, F.R.C.P., of Wimpole-street, London.

Lieutenant R. E. Paterson, R.N., H.M.S. *Fortune*, younger son of Professor A. M. Paterson, of Liverpool.

Midshipman E. R. Bates, R.N., H.M.S. *Indefatigable*, elder son of Dr. J. E. Bates, of Wimbledon, Surrey.

Midshipman W. F. R. A. Cooper, R.N., H.M.S. *Indefatigable*, only son of the late Dr. T. G. D. Cooper, of Penang.

Lieutenant R. I. Faulkner, R.N., H.M.S. *Black Prince*, younger son of Dr. C. I. Faulkner, late of Escrick, Yorks.

Midshipman E. T. Hodgson, R.N., H.M.S. *Invincible*, younger son of Dr. H. Hodgson, of Alresford, Hants.

Captain the Rev. C. W. Lydall, R.N., H.M.S. *Lion*, son of the late Dr. W. H. Lydall, of London,

Second Lieutenant C. R. Hind, South Staffordshire Regiment, second son of Mr. A. E. Hind, F.R.C.S., of Jersey.

Fleet-Surgeon H. L. Norris, R.N., H.M.S. *Indefatigable*, youngest son of the late Dr. H. E. Norris, of Charmouth, Dorset.

Surgeon G. B. Moon, R.N., eldest son of Dr. G. D. Moon, of Derby.

Surgeon A. A. Morison, R.N., H.M.S. *Indefatigable*, sixth son of the late Dr. D. Morison, of Bengal.

Captain H. R. H. O'Brien, Royal Field Artillery, only son of Lieutenant-Colonel J. O'Brien, I.M.S., of Instow, North Devon.

## THE HONOURS LIST.

The following awards to medical officers, either for services rendered in connexion with military operations in the field or for valuable services in connexion with the war, are announced in the list of Birthday Honours issued at the end of last week:—

*To be C.B. (Military Division).*—Surg.-Gen. W. G. A. Bedford, C.M.G.; Surg.-Gen. R. Porter; Surg.-Gen. T. J. O'Donnell, D.S.O.; Col. R. H. Luce, T.F. Res.; Lieut.-Col. C. C. Cumming, R.A.M.C.

*To be K.C.M.G.*—Col. (Hon. Surg.-Gen.) W. D. C. Williams, C.B., Australian A.M.C.

*To be C.M.G.*—Col. C. E. Harrison, C.V.O., A.M.S. (T.F.); Col. H. N. Thompson, D.S.O., A.M.S.; Col. T. B. Beach, A.M.S.; Col. C. W. R. Healey, A.M.S.; Col. J. B. Wilson, A.M.S.; Col. A. L. F. Bate, A.M.S.; Col. E. C. Freeman, A.M.S. (T.F.); Col. A. Fullerton, A.M.S.; Lt.-Col. H. E. R. James, C.B., R.A.M.C.; Lt.-Col. A. H. Lister, R.A.M.C. (T.F.); Lt.-Col. O. L. Robinson, R.A.M.C.; Lt.-Col. H. A. Bray, R.A.M.C.; Lt.-Col. (temp. Col.) E. W. Slayter, R.A.M.C.; Lt.-Col. T. P. Jones, R.A.M.C.; Lt.-Col. G. S. Thom, R.A.M.C.; Lt.-Col. J. V. Forrest, R.A.M.C.; Lt.-Col. L. Humphry, R.A.M.C.; Temp. Lt.-Col. W. H. Willcox, R.A.M.C.; Lt.-Col. and Hon. Col. Sir J. R. A. Clark, Bart., C.B., R.A.M.C. (T.F.); Maj. G. Hall, R.A.M.C. (T.F.); Lt.-Col. B. J. Newmarch, Australian A.M.C.; Lt.-Col. (temp. Col.) J. T. Fotheringham, Canadian A.M.C.; Lt.-Col. P. C. Fenwick, New Zealand A.M.C.

*To be Brevet Lieutenant-Colonel.*—Maj. (temp. Brig.-Genl.) A. C. Geddes, Unattached List (T.F.).

*D.S.O.*—Maj. H. V. Bagshawe, R.A.M.C.; Maj. B. S. Bartlett, R.A.M.C.; Lt.-Col. E. A. Bourke, R.A.M.C.; Capt. D. B. Chiles-Evans, R.A.M.C. (T.F.); Surg.-Maj. R. M. Cowie, 1st Life Guards; Maj. J. M. Darling, Spec. Res. R.A.M.C.; Maj. C. Farrant, R.A.M.C. (T.F.); Maj. (temp. Lt.-Col.) R. F. M. Fawcett, R.A.M.C.; Lt.-Col. T. H. Forrest, R.A.M.C. (T.F.); Maj. A. N. Fraser, R.A.M.C.; Capt. E. D. Gairdner, R.A.M.C. (T.F.); Lt.-Col. J. S. Gallie, R.A.M.C.; Lt.-Col. J. Grech, R.A.M.C.; Maj. P. H. Henderson, R.A.M.C.; Maj. G. W. Heron, R.A.M.C.; Capt. A. H. Heslop, R.A.M.C.; Capt. G. S. Husband, I.M.S.; Maj. (temp. Lt.-Col.) A. C. Osburn, R.A.M.C.; Lt.-Col. E. P. Sewell, R.A.M.C.; Capt. W. C. Smales, R.A.M.C.; Maj. W. M. B. Sparkes, R.A.M.C.; Maj. C. P. Thomson, R.A.M.C.; Capt. (temp. Maj.) A. E. Webb-Johnson, R.A.M.C. (T.F.); Maj. J. B. McLean, Australian A.M.C.; Capt. T. B. Brown, Australian A.M.C.; Capt. (temp. Maj.) R. D. Campbell, Australian A.M.C.—Major G. W. K. Crosland, late W. Riding Regt. (T.F.), who has received the distinction, is a medical man, and was serving in a combatant capacity.

*Military Cross.*—Temp. Capt. G. S. Blandy, R.A.M.C.; Capt. W. A. Brechin, R.A.M.C.; Temp. Capt. A. Bremner, R.A.M.C.; Capt. L. C. Bruce, R.A.M.C. (T.F.); Temp. Capt. W. H. Butler, R.A.M.C.; Temp. Lieut. I. W. Corkey, R.A.M.C.; Capt. W. R. Douglas, R.A.M.C.; Capt. K. K. Drury, R.A.M.C., Spec. Res.; Temp. Capt. C. R. Dudgeon, R.A.M.C.; Capt. G. E. Dyas, R.A.M.C.; Temp. Capt. A. C. Edwards, R.A.M.C.; Capt. T. J. C. Evans, I.M.S.; Capt. J. F. Farrow, R.A.M.C. (T.F.); Capt. A. D. Fraser, R.A.M.C.; Temp. Lt. C. T. Galbraith, R.A.M.C.; Capt. J. Gilmour, R.A.M.C.; Capt. G. R. Grant, R.A.M.C.; Capt. E. R. G. Greville, R.A.M.C.; Temp. Capt. A. C. Keep, R.A.M.C.; Temp. Capt. A. J. Kendrew, R.A.M.C.; Capt. C. Lovell, R.A.M.C.; Temp. Capt. M. A. MacDonald, R.A.M.C.; Lt. J. S. McCallam, R.A.M.C.; Capt. F. A. McCammon, R.A.M.C.; Capt. J. D. MacCormack, R.A.M.C., Spec. Res.; Temp. Lt. P. McGibbon, R.A.M.C.; Capt. H. S. Milne, R.A.M.C.; Temp. Lt. J. W. O'Brien, R.A.M.C.; Temp. Capt. H. J. Orr Ewing, R.A.M.C.; Capt. H. F. Panton, R.A.M.C.; Capt. D'Arcy Power, R.A.M.C.; Capt. G. E. J. A. Robinson, R.A.M.C.; Surg.-Capt. W. T. Rowe, S. Notts. Hrs. (Yeo.); Temp. Capt. H. H. Sampson, R.A.M.C.; Capt. L. R. Shore, R.A.M.C.; Lt. C. J. Stocker, I.M.S.; Temp. Capt. M. A. Swan, R.A.M.C.; Capt. D. C. Taylor, R.A.M.C.; Temp. Lt. N. S. Whitton, R.A.M.C.; Capt. H. F. Wilkin, R.A.M.C. (T.F.); Capt. G. E. Kidd, Canadian A.M.C.

## THE REGULATIONS FOR THE PROFESSIONAL COMMITTEES.

The following are the Regulations for Professional Committees in respect of duly qualified medical practitioners under the Military Service Acts, 1916:—

1.—(1) Subject as hereinafter provided, there shall be a Central Professional Committee for England and Wales and a Central Professional Committee for Scotland, consisting in each case of not less than 12 nor more than 25 members, appointed by members of the medical profession in such manner as the Army Council may approve, and representative of the profession, to which all applications for certificates of exemption made to a Tribunal in England or Wales or in Scotland as the case may be by or in respect of practitioners on any grounds other than that of conscientious objection shall be referred by the Tribunal to which such applications are made. (2) If the Army Council are satisfied that any existing Professional Committee which has been recognised by them for the purpose of making arrangements for the selection of practitioners for service during the war in the Naval and Military Forces of the Crown has been appointed by members of the profession and is representative of the profession, they may, if they think fit, and subject to such conditions as they may impose, approve such Committee for the purpose aforesaid, and in that case the Professional Committee so approved shall be the Central Professional Committee for the purposes of these regulations. (3) The Central Professional Committee may, with the approval of the Army Council, appoint or recognise such Local Professional Committees as they may think necessary for the purposes hereinafter mentioned.

2. Where an application for a certificate of exemption on any ground other than that of conscientious objection is made by or in respect of a practitioner to a Tribunal, the Tribunal shall forthwith notify the appropriate Central Professional Committee that the application has been made and shall send to that Committee the application together with any statement or particulars furnished to the Tribunal by or in respect of the practitioner.

3.—(1) The Central Professional Committee shall, subject as hereinafter provided, thereupon consider the matter, and, if they are satisfied on the facts before them that a certificate of exemption (whether absolute, conditional, or temporary) ought to be granted, they shall make a recommendation to the Tribunal accordingly. (2) The Committee in any case in which they are of opinion that the application does not give the required or sufficient particulars or does not disclose *primâ facie* grounds for considering the application, may require further and better particulars or grounds, as the case may be, to be given; and if such further and better particulars or grounds are not delivered to the Committee within seven clear days after such notification has been sent, or within such extended time as may be allowed by the Committee, the Committee may make forthwith such recommendation as they think appropriate. (3) For the purpose of ascertaining the facts relevant to the decision of an application the Committee may, and if so required by the practitioner in respect of whom the application is made, shall hear the practitioner and such witnesses as he may desire to call, and may take into consideration any written statements sent by or in respect of any practitioner. (4) At least seven clear days before the hearing of an application the Committee shall send to the practitioner notice in writing of the time and place fixed for a hearing.

4.—(1) Subject as hereinbefore provided, the Central Professional Committee may, if they think fit, and before hearing the practitioner or coming to a decision upon the application, refer any application to the Local Professional Committee of any area in which the practitioner resides or carries on medical practice, for consideration and report on all or any of the matters connected therewith, and may in that case forward to the Local Committee for the purpose any documents in their possession relating to the application. (2) The Local Professional Committee shall make such inquiries into the circumstances of the case as they think fit and may invite the practitioner to appear before them and to call such witnesses as he may desire, and shall as soon as may be report any facts ascertained by them and their opinion on the case confidentially in writing to the Central Professional Committee.

5.—(1) In the case of an application for a certificate of exemption other than on the ground of conscientious objection which is made by or in respect of a practitioner who is a member of the staff (including the residential and teaching staff) of any hospital or medical school situated within the Administrative County of London, or by or in respect of any other practitioner in England or Wales where the Army Council or the Central Professional Committee deem it advisable, the Central Professional Committee shall forthwith refer the application for consideration to a Committee of Reference appointed by the Royal College of Physicians of London and the Royal College of Surgeons of England and approved for this purpose by the Army Council, and in such case the recommendation shall be made by the Committee of Reference and shall be transmitted by them to the Central Professional Committee and by that Committee to the Tribunal. (2) The provisions of Article 3 (2) of these Regulations shall apply in the case of applications referred to the Committee of Reference, but, subject as aforesaid, the procedure of the Committee of Reference on the consideration of an application shall be such as the Committee of Reference may determine. (3) The Army Council may, if they think fit, and subject to such conditions as they may impose, approve for the purposes aforesaid any existing Committee of Reference recognised by them which has undertaken similar duties in connexion with the selection of practitioners for service during the war in the Naval and Military Forces of the Crown.

6.—(1) The Central Professional Committee shall elect a chairman who shall preside at all meetings of the Committee held for the purpose of dealing with matters arising under these Regulations, and if the chairman is absent from any meeting the members present shall choose one of their own number to preside, and that member shall for the time being have all the powers of the chairman. (2) The quorum of the Committee shall be such number of members, not being less than five, as the Committee may decide. (3) Proceedings of any committee under these Regulations shall not be open to the public.

7. Questions before the Central Professional Committee shall be decided by a majority of the members present and voting, and in the event of an equality of votes, the chairman shall have a second or casting vote.

8.—(1) A practitioner may appear at any hearing before the Central Professional Committee personally, or, in any case where the Committee so permit, by a representative. (2) The Committee at any

hearing may, if they think fit, hear witnesses other than the witnesses, if any, called by the practitioner, and the practitioner or his representative may put to such witnesses such questions as appear to the Committee to be relevant.

9. Notices and applications required to be delivered to the Central Professional Committee shall be sent to the office of the Committee, and may be delivered at or sent by post to that office, and notices required to be sent to a practitioner in respect of whom an application for a certificate of exemption is made may be sent by post to or delivered at his usual place of residence.

10. Subject as hereinbefore provided, the Central Professional Committee shall, so soon as they have considered an application and come to a decision thereon, communicate their recommendation in writing to the Clerk of the Tribunal by which the application has been referred; and a register of all applications and of the decisions thereon shall be kept by the Central Professional Committee.

11. The Military Service Regulations (Amendment) Order, 1916, shall not apply to an application by or in respect of a practitioner for a certificate of exemption where those Regulations are inconsistent with the provisions of these Regulations.

12. In these Regulations "practitioner" means a duly qualified medical practitioner.

## A BENEVOLENT FUND FOR THE SERVICES AUXILIARY TO THE ROYAL ARMY MEDICAL CORPS.

A general meeting of officers of the auxiliary branches of the Royal Army Medical Corps was held on June 1st in the Royal Army Medical College, Grosvenor-road, S.W. About 100 officers attended. The Director-General, Sir Alfred Keogh, was in the chair, and briefly explained why the meeting had been called, and outlined the objects of the various benevolent funds connected with the regular Royal Army Medical Corps. In the course of the discussion Dr. Samuel West, treasurer of the Royal Medical Benevolent Fund, pointed out that there might be some danger of overlapping with existing institutions. It was unanimously decided by the meeting that a benevolent fund should be raised for the auxiliary branches of the Royal Army Medical Corps—i.e., Special Reserve, Temporary R.A.M.C., R.A.M.C. Territorial Force—and a Provisional Committee of eight members was appointed to inquire into the whole subject and to draw up some rules and regulations, and to report as to the feasibility of the scheme to a general meeting to be held towards the end of June. The Director-General was warmly thanked for the interest he took in the welfare of the medical services of the army, and a vote of thanks to him for presiding brought the proceedings to a close.

## THE EXCHANGE OF INVALID PRISONERS.

During the last month the arrangements have been completed for the exchange of invalid prisoners between Great Britain and Germany and for their internment in Switzerland. A certain grade of incapacity or invalidity has been deemed necessary for this internment in Switzerland, a higher grade of complete incapacity entitling the prisoner to entire release and return to his own country. Although the conditions are in the main the same as those arranged between France and Germany and noted in THE LANCET of April 29th (p. 936), rather more elasticity has been allowed and the revised list is therefore repeated here.

*List of Diseases, Infirmities, and Results of Wounds Considered as Rendering Prisoners of War Eligible for Internment in Switzerland.*

1. Tuberculosis of the respiratory organs, even in incipient stages.
2. Tuberculosis of other organs (skin, glands, bones, joints, digestive organs, urinary system, sexual organs, &c.).
3. Chronic constitutional diseases, chronic affections of the blood, and chronic intoxications (malaria, diabetes, leucocythæmia, pernicious anæmia; poisoning by chlorine, carbon monoxide, lead, mercury, &c.).
4. Chronic affections of the respiratory system (stenosis, marked emphysema, chronic bronchitis, chronic pleurisy, &c.).
5. Chronic affections of the circulatory system (heart disease, diseases of the heart muscle, aneurysm, severe varix, arteriosclerosis, &c.).
6. Chronic affections of the digestive organs with bad nutrition, necessitating special diet of long duration.
7. Chronic affections of the urinary and sexual organs (chronic nephritis, stone, hypertrophy of prostate, &c.).
8. Chronic affections of the central and peripheral nervous system (hysteria, epilepsy, Graves disease, chronic sciatica, paralysis, and other grave nervous conditions).
9. Chronic diseases of the organs of the senses (glaucoma, inflammation of the cornea, iris, choroid, &c.; chronic middle-ear disease).
10. Blindness or the loss of one eye if the remaining eye does not possess normal vision without glasses.
11. Deafness in both ears.
12. Chronic disease of the skin of wide extent (cutaneous ulcers, fistulæ).
13. Chronic articular rheumatism and gout with visible or tangible deformity.
14. Malignant or non-malignant tumours, but with marked functional troubles.
15. Severe general debility due to age or disease.
16. Serious forms of syphilis causing functional troubles.
17. Loss of a limb in an officer or non-commissioned officer. [Privates under such conditions are exchanged.]
18. Stiffness of important joints, false joints, shortened limb, atrophy of muscle, paralysis due to gunshot wounds and likely to be of long duration.
19. All conditions resulting from disease or wounds not included in the above-mentioned categories, but causing unfitness for military service for at least one year (mutilation of face or jaw, trephining, indolent ulcers, &c.).
20. Isolated cases not included in any of the above categories whose wounds or disease are of equal severity to those in the above categories, and which in the opinion of the Commission make necessary internment in Switzerland.

The following should be excluded:—

(*a*) All serious nervous or mental affections requiring treatment in a special establishment.

(*b*) Chronic alcoholism.

(*c*) All communicable diseases within the period of their infectivity (infectious diseases, gonorrhœa, syphilis, venereal sores, trachoma).

The working out of the scheme was done by M. Hoffmann, member of the Swiss Government, and a Sanitary Commission of Swiss medical men appointed to visit the combatant countries and make the selection among the prisoners. The commission, with Lieutenant-Colonel Sturzenegger, Commandant of the 4th Sanitary Division of the Swiss army, at its head, is just now completing its work in this country and will shortly be returning. In Switzerland certain districts possessing special virtues for invalids have been selected by the Swiss army surgeons, and in each district a medical officer of high standing, with the title of Director of Internment, has been appointed. Different areas have, of course, been selected for the various nationalities. The directors have prepared suitable quarters for officers and men, and their task has been made the easier by reason of the fact that many of the best hotels are practically empty of visitors, and the proprietors are therefore doubly glad to be of service to the victims of war. The prisoners, or, as they are called in Switzerland, *internés*, are not entirely free, although allowed a large degree of liberty. No military guard is provided, the keeping of order being left entirely in the hands of the Swiss police, and that this will be an irksome supervision no one will think who has ever known a Swiss *Landjäger* well. The privates are under the command of their own non-commissioned officers who know best how to deal with them. In each village a non-commissioned officer is appointed as local chief of the *internés*, and in every hotel there is a *sous-chef*. The men live under a régime which is based on military precedent, but entirely salutary on hygienic grounds for convalescents. Those who are not disabled by wounds, or otherwise, rise at 6.30, breakfast at 7.15, do their rooms and share the general work of the house between 8 and 10, which is also the time for medical treatment. From 10 to 11.30 exercise is taken under the surveillance of a non-commissioned officer. Dinner is served from 12 to 1, after which exercise is taken in common from 1 to 5 under the orders of the physician. From 5 to 6.30 the men are free to walk about the villages. Supper is from 7 to 8, bedtime at 9, and lights out at 9.30. The freedom is complete from 5 to 6.30 within the appointed area and must be particularly grateful to men who have for long been living as prisoners of war. They may go to cafés and taverns, but in supplying alcoholic drinks the responsibility is placed on the inn-keeper who is severely dealt with in case of excess.

The diet of the men is carefully arranged so as to give a minimum of 2000 calories in carbohydrates, 450 in proteids and 500 in fat. Friday is a meatless day, meat being in Switzerland a costly item of diet. The men are weighed regularly every fortnight and the charts sent to the army surgeon for control so as to detect at once if the nutrition in some quarter is deficient. The Chief Commissioner at a complimentary dinner given by the Swiss colony in London told his audience that French and German prisoners had often gained from 6 to 10 lb. during their first few weeks of internment in the good Swiss air, but the English medical officer who accompanied the mission laughingly expressed the doubt whether it would be possible for the German prisoners about to be released from England to put on weight after their good feeding in this country.

For treatment the men are placed in charge of competent physicians whose task it is to relieve disease and the after-effects of wounds, and to make the men useful and self-supporting members of society again. Those that need special treatment are sent to health-resorts which deal with their particular condition, as Ragaz, Aigle, Bex, Schinznach, Yverdon, and Loeche. Tuberculous cases are taken in at

Leysin, Montana, Davos, and Arosa. Orthopædic institutions are provided, or are in course of preparation, and there is a large surgical hospital in Lucerne where any major surgery will be performed by first-rate operators.

There are already some 9000 Frenchmen interned in Switzerland, a large number of Belgians, more than 3000 Germans, and it is anticipated that more than 500 English invalid prisoners will be released. The British *internés* will at present be stationed at Château d'Oex, one of the most delightful subalpine spots in the Bernese Oberland, and at other villages such as G'staad in the same upland valley. Château d'Oex is more than 3000 feet above sea-level, and both as health-resort and sport centre has enjoyed some little popularity among British travellers for ten years past. There is still, even during war-time, a small English colony, and the British chaplain, Rev. E. Dudley Lampen, is chairman of the local committee which is to assist in providing comforts and luxuries for the men.

The whole system has now been tried with French and German *internés* for some three months and has worked exceedingly well. A few prisoners have tried to escape, but these were all recaptured before they left Switzerland. Nothing would be gained if they were to reach their native land, because, according to agreement, they must then be returned to Switzerland. Most of them are, of course, so gravely invalided that they would be incapable of doing military work for at least twelve months. The threat that if a man behaves badly he will be returned to his prison-camp is used as a simple and effective means of enforcing discipline, but there has been no need as yet of putting it into execution in a single case. Captain F. Schwyzer, of Kastanienbaum, Lucerne, is the officer in charge of the department of British internment; he is a Swiss medical man who has lived in America and is one of the members of the sanitary commission now in this country. Dr. Oscar Bernhard, of St. Moritz, another member of the commission, whose name will be remembered as the pioneer of the open-air and sun treatment of surgical wounds, hopes to be able to introduce insolation treatment for the unhealed wounds of war. At 3000 feet the proportion of ultra-violet rays in the light is naturally much higher than that at sea-level.

To avoid needless idleness and its results the *internés* are encouraged to work at the trades at which they are most competent, and an endeavour is made to find occupation for those who have no trade or skill. Many take up gardening, others engage in shoemaking, tailoring, and laundry-work, or act as barbers. Newspapers and books are usually furnished by some charitable society from home, and wherever there are prisoners there are small libraries springing up. Among a certain group of *internés* a voluntary worker is supplying free of charge to them any technical books required for their work, and this might well be done by some public-spirited person for those at Château d'Oex.

What has been said about restrictions applies only to private soldiers. Interned officers occupy entirely separate quarters and are practically free to move as they like. At night they are to report at their quarters unless they are living with their own family.

On Tuesday, May 30th, the first two trains arrived at Chateau d'Oex, bringing British wounded prisoners of war from German camps. The total for this day was 217 men and 30 officers. A reception had been organised to welcome the soldiers and a crowd of some 5000 witnessed the touching scene. The men are all badly wounded, many were on crutches, many had lost an arm, or a leg, or an eye. The ladies of the British Colony had organised a tea for the soldiers, and speeches of welcome were delivered by the British Minister, Mons. Favrod-Coune, the Deputy, and the Rev. E. Dudley Lampen, the British chaplain. On Wednesday, May 31st, another contingent of 140 men arrived.

We learn from Mr. Lampen that the soldiers have been put up at the various hotels and pensions under the care of the Swiss military doctors, that all are doing well in the fine mountain air, and that there are only a few hospital cases. At the end of June a third contingent of 100 men is expected at Château d'Oex, which will bring the total received in the valley to some 500 men.

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ON June 6th and 7th a war fair on behalf of the funds of the Wounded Allies Relief Committee was held at the Caledonian Market, Islington. The fair took the form of a monster rummage sale, and was opened on the first day by the Lord Mayor. The City of London gave the use of the market, and the allied countries and the colonies were represented by special stalls. The attendance was good on the first day.

A NEW AMBULANCE TRAIN FOR THE NAVY.—During the coming Whitsuntide the Lords Commissioners of the Admiralty have given permission for the exhibition, at Addison-road Railway Station, Kensington, W., of a new naval ambulance train which has just been handed over to them by the London and North-Western Railway. The train will form the latest example of ambulance transport. It is 600 feet long and equipped to meet the special requirements of the Admiralty. There are 12 coaches serving as wards, where the patients are carried in cots slung as on board ship. This enables a wounded man to be transferred from the ship to the train without being taken out of his cot. A charge of 1*s.* will be made to visitors, and the proceeds will be given to the Dreadnought Hospital for Seamen, Greenwich.

BRITISH SPORTSMEN'S AMBULANCE FUND.—This Fund has been organised at the National Sporting Club. At a luncheon at the club on Monday last, presided over by Lord Lonsdale, Mr. James White explained the great need of ambulances at many points on our line and the lines of our Allies in France, and it was decided to attempt to provide a fleet of at least 100 ambulance cars at a cost approximately of £400 each car. All subscriptions should be addressed to the Honorary Treasurer of the Fund at the National Sporting Club, Covent Garden, London, W.C. They will be acknowledged in the press.

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# Medical News.

UNIVERSITY OF OXFORD.—The degree of Doctor of Medicine has been conferred upon John Howell Evans.

APOTHECARIES' HALL OF IRELAND.—The next professional examinations of the Apothecaries' Hall of Ireland will commence on the following dates: Primary Professional, Monday, July 3rd; Intermediate, Part 1, Monday, July 10th; Intermediate, Part 2, Monday, July 17th; Final Professional, Monday, July 24th.

CHADWICK LECTURES ON MEASLES.—At the second Chadwick lecture on Measles[1] the chairman, Sir James Crichton-Browne, said that he hoped the Compulsory Notification Order would open the eyes of the public to the seriousness of the disease. It was indeed a deadly scourge, accounting for some 11,000 deaths annually, nine-tenths of which were in the first five years of life, and in a host of cases crippling where it did not kill. The death-rate alone gave therefore a wholly inadequate picture of its devastating character. Dr. H. J. Cates opened with the dogmatic statement that notification would prove to be the keystone of the arch of any administrative system of control of measles. He dealt with the objections which had been raised to notification, and with regard to the cost he estimated the value of a saved life to the community at £200 to £300, a sum which would pay for some 4000 notifications at the "war price." He called attention to the gratifying fact that in Birmingham already parents are now notifying almost as many cases as doctors. The remainder of the lecture was occupied with a discussion of various administrative measures for dealing with the disease. The lecturer was entirely in agreement with the late Sir Richard Thorne Thorne, who 20 years ago saw the necessity of combining all such measures if any effective control was to be obtained. Each suspected case must be followed up (1) promptly; (2) by a woman who is a trained nurse of experience or by an instructed health visitor; and (3), most important of all, by one in possession of local knowledge. In case of an extensive epidemic with which the permanent staff was insufficient to deal, temporary workers should be taken on to relieve the staff in their other work and not to visit the measles cases. Finally, continuous revisitation was essential, and it was in this point that some otherwise well-laid schemes had failed. The instructions for home nursing might be left to the various local associations to formulate their own rules, but a useful model had already been drawn up by the Central Council for District Nursing in London.[2]

[1] The first lecture was noticed in THE LANCET of June 3rd, 1916, p. 1151.

[2] The rules summarised in THE LANCET of March 4th, 1916, p. 525.

Hospital accommodation must be provided at any cost for those cases too ill to be nursed at home or housed in unsuitable surroundings. For such cases even in hospital a high mortality must be faced. In the St. Helens epidemic it had approached 18 per cent., and the experience of the Metropolitan Asylums Board was to the same effect. In regard to the control of contacts, adults might be left out of consideration. Dr. William Butler's figures for Willesden had shown that 97 per cent. of children over 15 years of age had already had measles and were therefore practically immune. Of school measures the attempt in recent years to control infection by closing the school on the ninth day after an infected child had been introduced for a period of five or six days, during which an incubating child would presumably sicken at home, had been favourably reported upon. It must, however, never be forgotten that the control of measles was not primarily a school attendance question, because the cases were principally below school age.

PUBLIC HEALTH IN ABERDEEN: REPORT OF MEDICAL OFFICER OF HEALTH.—Dr. Matthew Hay, the medical officer of health of the city of Aberdeen, has issued his report for 1914, and also abbreviated reports for 1915 by the medical officer of health and the sanitary officer. Referring to the popular belief that during or after great wars the proportion of males to females born increases, the report says that the proportion of boys to girls born in 1915 was 100·5 to 100. Only in one year since 1907 were fewer boy babies born in Aberdeen. As to the outcry about "war babies," in Aberdeen, a garrison town, the proportion of illegitimate births in 1914 was 9·4 per cent. of the total number of births, which was lower than any year since 1908. In 1915 the percentage was 10·0 of the total births. In fact, illegitimacy has decreased since war began. In 1915 the percentage of marriages was equal to 11·3 per 1000 of the population, by far the largest rate ever recorded in the city since registration began. Irregular (so-called) marriages have greatly increased in number, undoubtedly owing to the war. During 1915 the death-rate was equivalent to 18·6 per 1000. This is the highest death-rate in any year since 1900. The average age at death was 36·3 years, as against an average of 37·9 for the preceding ten years. The excessive mortality during 1915 was mainly due to a considerable increase in deaths from lung diseases (pneumonia and bronchitis), from measles and whooping-cough, from diseases of the digestive system, and from atrophy and debility. The recorded death-rate from cancer and other malignant diseases was the highest since the commencement of civil registration. The death-rate from pneumonia was 128 per 100,000. This is also the highest recorded rate with the exception of the year 1902, when the rate was 134 per 100,000. Scarlet fever was more prevalent than in any year since the commencement of notification in 1881. The case mortality was 7·7 per cent., or nearly three times the average for the three preceding years. Scarlet fever may be said to have been continuously epidemic in Aberdeen since 1908, with the exception of a small recession in 1910. There were 675 notifications of diphtheria in 1915, as against 1627 in 1914 and 2062 in 1913. The case mortality was 7·5 per cent., slightly above the average for the preceding ten years. Dr. Hay alludes to the suggestion that the extensive use of gas-cookers for heating apparatus in houses, especially where no provision was made for carrying the fumes of the burned gas into a chimney, might have some connexion with the excessive prevalence of diphtheria in the last three years. But he says that his inquiries proved that the proportion of households with gas-cookers was exactly the same for diphtheria and scarlet fever, and that this fact would seem to point to the conclusion that gas-cookers had no predisposing effect for diphtheria, unless it were assumed that the effect existed, but was equally strong for both diseases. This, he thinks, is not likely to be the case. The suggested predisposing effect was merely the possible effect of the combustion products of gas, and also of the undue heating of the atmosphere, in rendering the throat more susceptible to diphtheria infection. Against the suggestion there is also the fact that gas-cookers are probably as extensively used in many other large towns as in Aberdeen, and yet in many of these towns there has been no unusual increase in diphtheria such as Aberdeen has experienced. There were 19 cases of epidemic cerebro-spinal meningitis reported, 14 of which ended fatally. The cases included 6 soldiers and 1 officer, all of whom except one died.

EMIGRATION FROM IRELAND.—During 1915 the number of persons who left Ireland was the lowest recorded since 1851, when the collection of emigration returns began. The total number of emigrants in 1915—6671 males and 4121 females—was 10,792, being 2·4 per 1000 of the estimated population. It appears that 83·6 per cent. of the persons who left Ireland in 1915 were between the ages of 15 and 35, as compared with 86·6 in 1914. The United States was the destination of 6681 emigrants in 1915.

# Parliamentary Intelligence.

## NOTES ON CURRENT TOPICS.

*The Whitsun Recess.*

PARLIAMENT has risen for the Whitsun recess. The House of Commons resumes on Tuesday, June 20th. So long as the war continues it seems unlikely that Parliament will take a continuously extended holiday.

*The Supply of Petrol.*

A preliminary report has been made by the committee appointed by the Board of Trade to control the supply and distribution of petrol. It indicates directions in which the use of petrol for pleasure purposes may be restricted. It is hoped that the detailed recommendations will soon be available. The Board of Trade anticipates that action will then immediately be taken.

## HOUSE OF COMMONS.

WEDNESDAY, MAY 31ST.

*Artificial Limbs for Soldiers and Sailors.*

Mr. BARNES asked the Secretary to the Admiralty whether, although injury pensions were granted to soldiers and sailors who had lost a limb, or limbs, in the defence of their country, they were dependent upon charity for the supply of the necessary artificial limbs.—Mr. MACNAMARA replied: All artificial limbs for soldiers and sailors rendered necessary by injuries received on service are supplied in the first place and subsequently repairs carried out or replacement when necessary made at the expense of the Admiralty, War Office, or Greenwich Hospital funds. The particular class of limb fitted is decided on by skilled orthopædic surgeons, bearing in mind the man's probable future employment. No sailors or soldiers are dependent on charity for such appliances.

*British Red Cross Units in Italy.*

Mr. ELLIS GRIFFITH asked the Under Secretary for War how many British subjects of military age were engaged in the British Red Cross units in Italy; and what authority granted them exemption from military service.—Mr. TENNANT answered: There is at present no complete returns of the numbers employed in British Red Cross units in Italy in possession of the Army Council. There is no rule excepting these men from military service, but those who are classified in medical categories which are not being called up are not interfered with.

*Chief Medical Officers in Dardanelles and Mesopotamia.*

Mr. SHIRLEY BENN asked the Under Secretary for War whether he would give the name of the chief medical officer with the Expeditionary Force at the Dardanelles, and also the name of the medical officer who had the responsibility in regard to medical provision for the expedition to Mesopotamia.—Mr. TENNANT said, in reply: The Director of Medical Services of the Expeditionary Force at the Dardanelles was, first, Surgeon-General Birrell, and later, Surgeon-General Bedford. The arrangements for the Mesopotamian Expedition were made by the Government of India, and Surgeon-General Hathaway was the Director of Medical Services of the Force. Surgeon-General Sir W. Babtie was Director of Medical Services in India at the time.

*The National Insurance Act.*

Mr. CURRIE asked the representative of the National Insurance Commissioners whether, in view of the emphasis laid by the report of the investigation committee upon the facts that when the Insurance Act was passed the prospect was held out to insurers that they would receive a direct benefit from the wisdom of their choice of a society, and that, in view of the committee, the insurance scheme as a whole cannot possibly be said to satisfy the usual requirements of a flat-rate system, it was intended to introduce further legislation.—Mr. CHARLES ROBERTS wrote in reply: The interim report of the Departmental Committee is now under consideration by the Treasury.

THURSDAY, JUNE 1ST.

*Prisoners of War in Germany.*

Major HUNT asked the Secretary for Foreign Affairs whether his attention had been called to the statements of totally disabled British soldiers just returned from Germany to the effect that the food was so bad that rats would not eat it, and that British soldiers with wounds still unhealed were compelled to dig trenches.—Sir EDWARD GREY replied: The Government Committee on the Treatment by the Enemy of Prisoners of War will, no doubt, shortly take the evidence of the disabled British soldiers recently returned from Germany and the evidence will receive our careful consideration.

*The Production of Optical Glass.*

Major CHAPPLE asked the Minister of Munitions, whether, before committing himself to any encouragement to the

establishment of an imperial school of technical optics and the costly overlapping it might involve, he would cause inquiry to be made into the accommodation and facilities for experimental and research work on optical glass and on lens problems at the Imperial College of Science and Technology, South Kensington.—Colonel LEE (Parliamentary Secretary (Military) to the Ministry of Munitions) replied: The Minister of Munitions is fully alive to the importance of dealing with the matter by a comprehensive scheme such as he understands is favoured by the Board of Education and the London County Council, which would include both the Imperial College and the Northampton Institute and would obviate anything like overlapping or competition.

*Sterilisation of Hypodermic Needles.*

Major GUINNESS asked the Under Secretary for War whether he was aware that when inoculating troops against typhoid and cholera certain officers of the Royal Army Medical Corps did not sterilise their hypodermic needles between individual inoculations, relying solely on the sterilisation of the skin, which incurred the risk of local or general septic infection; whether he was aware that there was an objection on the part of troops to be inoculated under such conditions; and whether he would issue a general order to all medical officers concerned in the Expeditionary as well as the Home forces defining the sterilisation methods which ought to be adopted.—Mr. TENNANT wrote in reply: I am not aware that certain officers of the Royal Army Medical Corps do not sterilise their hypodermic needles between individual inoculations. Instructions have been and are now issued with all consignments of antityphoid vaccine emphasising the importance of sterilising the needle after each injection. This is understood to be a routine practice with all injections. If there is evidence that these instructions are in some instances not being followed all commands will be informed.

*Soldiers' Leave and Small-pox Outbreaks.*

Mr. CROOKS asked the Under Secretary for War whether an Army Order had been issued which would have the effect of curtailing soldiers' leave on account of small-pox outbreaks in the counties of Lancashire, Northumberland, Durham, Glamorganshire, and Monmouthshire; and whether, seeing that the vast majority of the soldiers had been recently vaccinated, such an order was considered necessary.—Mr. TENNANT (in a written answer) replied: Orders were issued with reference to the counties mentioned, but have now been withdrawn, except in the case of three towns where cases of small-pox have recently occurred. Restrictions will not be enforced in regard to men who have been recently successfully vaccinated.

*Dental Benefit under the National Insurance Act.*

Mr. RAFFAN asked the representative of the National Insurance Commissioners whether it was within the competence of any approved society under the National Insurance Act to expend any portion of its funds upon the provision of dental benefits for its members with or without the approval of the National Insurance Commissioners.—Mr. CHARLES ROBERTS answered: In accordance with Section 37 of the Act of 1911 the additional benefits specified in Part II. of the Fourth Schedule to the Act can only be provided in a society whose funds show a surplus on valuation. The commissioners are, however, advised that it is within the competence of a society to make subscriptions or donations under Section 21 of the Act to a charitable institution having amongst its objects the provision of dental treatment which is available for the members of the society.

Mr. RAFFAN: Am I to understand that the society cannot directly give this benefit out of its own funds?—Mr. ROBERTS: It can make a subscription to the charitable societies for the purpose.

Mr. RAFFAN: My question is whether the society cannot directly give benefits out of its own funds?—Mr. ROBERTS: I think in that case it could only give the benefit after a valuation and as the result of a declaration.

*Bleached Flour.*

Mr. HASLAM asked the President of the Local Government Board whether the sale of flour bleached by chemical process was forbidden within the United States; whether the sale of such flour was still permitted in the United Kingdom; whether any such flour was imported from the United States; and, if so, would he state the quantity imported from that source during the last recorded year.—Mr. LONG wrote in reply: There is no law specifically prohibiting the sale in the United Kingdom of flour bleached by artificial means, but I understand that a decree pronouncing flour so treated to be adulterated has been made in the United States. The sale in this country of flour or other food materials is subject to the control provided by Sections 3 and 6 of the Sale of Food and Drugs Act, 1875. The laws of the United States do not prohibit the export of bleached flour to this country, and there is no information as to what proportion of the flour coming to the United Kingdom from the United States is artificially bleached.

*Health Visitors in Metropolitan Boroughs.*

Mr. KING asked the President of the Local Government Board whether he would state the number of health visitors in the following metropolitan boroughs respectively: Camberwell, Islington, Southwark, Bermondsey, Bethnal Green, Shoreditch, and Poplar; how many health visitors were required in each of these boroughs to meet the needs of the infant population according to the recognised demand of the Board; and, in cases where the numbers were inadequate, what action he proposed to take.—Mr. LONG wrote in reply: The number of health visitors in the boroughs referred to according to the information in my possession is given in the following table:—

| Metropolitan borough. | Number of births in 1915. | Number of health visitors appointed by Boro' Council. | Number of health visitors appointed by voluntary agencies. |
|---|---|---|---|
| Bermondsey ... | 3547 | 2 | 2 paid and some unpaid visitors. |
| Bethnal Green | 3514 | 2 | None. |
| Camberwell ... | 6149 | None. | One. |
| Islington... ... | 7544 | None. | 3 paid visitors who give their whole time, and 1 who gives half time. |
| Poplar ... ... | 4742 | 2 (1 vacancy). | 14 paid visitors who give their whole time, 1 who gives part time, and some unpaid visitors. |
| Shoreditch ... | 3114 | 2 | 3 paid visitors who give their whole time, and 1 who gives 4 days a week. |
| Southwark ... | 5239 | 1 | 3 paid and some unpaid visitors. |

In a memorandum which I have issued it is stated that roughly one health visitor is required for each 500 births. The proportion varies with the social and other conditions of the area. In cases in which the health visiting staff is considered insufficient for the needs of the district my department urge the local authority to appoint more health visitors. They are still in correspondence with some of the borough councils in the above list on this subject. Nearly all the metropolitan boroughs have been visited by my inspectors and action urged.

# Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index).*
*When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

BOURNEMOUTH, ROYAL VICTORIA AND WEST HANTS HOSPITAL.—House Surgeon, unmarried, for six months. Salary £150 per annum and extras, with board, &c.

BRADFORD, CITY OF.—Two Temporary Female Medical Officers. Salary 8 guineas per week.

BRIGHTON COUNTY BOROUGH ASYLUM, Haywards Heath.—Locum Tenens Assistant Resident Medical Officer for five weeks. Salary £6 6*s.* per week, &c.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

DARLINGTON HOSPITAL AND DISPENSARY.—House Surgeon. Salary £160 to £200 per annum, with board, &c.

DUBLIN UNIVERSITY, TRINITY COLLEGE SCHOOL OF PHYSIC.—Chair of Surgery.

DUDLEY, GUEST HOSPITAL.—Senior Resident Medical Officer. Salary £150 per annum, with board, &c.

GRAVESEND HOSPITAL.—Female House Surgeon. Salary at rate of £200 per annum, with board, &c.

GREAT YARMOUTH HOSPITAL.—House Surgeon, unmarried. Salary £200 per annum, with board, &c.

HAMPSTEAD GENERAL HOSPITAL, Haverstock-hill, N.W.—Resident House Physician for six months. Salary £200 per annum, with usual allowances.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—Assistant Resident Medical Officer. Salary £100 per annum, with board, &c.

HUDDERSFIELD COUNTY BOROUGH.—Assistant Medical Officer of Health. Salary as arranged.

HUDDERSFIELD ROYAL INFIRMARY.—Senior House Surgeon and Assistant House Surgeon. Salaries £150 and £100 per annum, with board, &c

KING EDWARD VII.'S HOSPITAL FOR OFFICERS.—Resident Medical Officer.

LEAMINGTON SPA, WARNEFORD GENERAL HOSPITAL.—Two Resident Medical Officers. Salary £250 and £150 per annum, with board, &c.

LEEDS GENERAL INFIRMARY.—Resident Aural Officer. Salary £100 per annum. Also Resident Obstetric Officer. Salary £50 per annum. Also Resident Medical Officer at Ida and Robert Arthington Hospitals. Salary £60 per annum, all with board, &c.

LONDON TEMPERANCE HOSPITAL, Hampstead-road, N.W.—Assistant Resident Medical Officer for six months. Salary at rate of £120 per annum, with board, &c.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Parkplace, Cheetham Hill-road.—Female House Surgeon. Salary £120 per annum, with board, &c.

METROPOLITAN HOSPITAL, Kingsland-road, N.E.—Surgeon for Diseases of Women.

NEW HOSPITAL FOR WOMEN, Euston-road, N.W.—Two Female House Surgeons and One Female House Physician for six months. Salaries £50 per annum, with board, &c. Also Female Senior Clinical Assistant to Out-patient Department; also as Anæsthetist. Salary £10 10s. per annum. Also Clinical Assistants to Out-patient Department, Wednesday and Saturday afternoon.

OXFORD EYE HOSPITAL.—House Surgeon. Salary £100 per annum, with board, &c.

PRESTON, LANCS, COUNTY ASYLUM, Whittingham.—Assistant Medical Officer. Salary £250 per annum first year, £300 second, with board, &c. Also Locum Tenens. Salary £7 7s., with board, &c.

PRESTON ROYAL INFIRMARY.—Resident Medical and Surgical Officer. Salary as arranged.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Surgeons for six months. Salary £100 per annum, with board, &c.

ST. MARK'S HOSPITAL FOR CANCER, FISTULA, AND OTHER DISEASES OF THE RECTUM, City-road, E.C.—House Surgeon. Salary £150 per annum, with board, &c.

SHEFFIELD ROYAL INFIRMARY.—House Physician. Salary £120 per annum, with board, &c.

SUFFOLK, BECCLES, 1ST MOUNTED BRIGADE FIELD AMBULANCE.—Two Medical Officers. 2/2ND LOVAT SCOUTS: Regimental Medical Officer.

SUNDERLAND, COUNTY BOROUGH.—Temporary Tuberculosis Medical Officer. Salary £500 per annum.

WEST RIDING OF YORKSHIRE, MIDDLETON-IN-WHARFEDALE SANATORIUM, near Ilkley.—Female Assistant Medical Officer. Salary £300 per annum.

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THE Secretary of State for the Home Department gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act, for County Court Circuit No. 50, attached more particularly to the Brighton, Lewes, Arundel, Chichester, Worthing, and Haywards Heath County Courts. Applications should reach the Private Secretary, Home Office, not later than July 1st next.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Gainsborough, Lincolnshire.

# Births, Marriages, and Deaths.

## BIRTHS.

BARKLEY.—On May 14th, at Sandy-lane, Cheam, Surrey, the wife of Lieutenant-Colonel J. Barkley, R.A.M.C., of a daughter.

MACKENZIE.—On June 2nd, at Rose Hill, Dorking, the wife of S. Morton Mackenzie, M.B., of a son.

WOOLF.—On June 5th, at Wimpole-street, W., the wife of Captain A. E. Mortimer Woolf, F.R.C.S., R.A.M.C., of a daughter.

## MARRIAGES.

HODGE—SYMES.—On May 30th, at Crediton Church, Captain W. Lang Hodge, R.A.M.C., to Marian Hilda Symes, of Manor House, Crediton.

PHILLIPPS—STEWART.—On May 2nd, at St. Ninian's Episcopal Church, Glasgow, Captain Richard Biddulph Phillipps, R.A.M.C., to Katherine Jane, youngest daughter of the late Captain James Stewart, 16th Lancers, and Mrs. Stewart, of Williamwood, Cathcart, Renfrewshire.

SANER—DENOUX.—On May 31st, at Brompton Oratory, S.W., John Godfrey Saner, M.C. Cantab., F.R.C.S. Eng., to Fernande Gabrielle, daughter of the late Monsieur Denoux and of Madame Denoux.

STOPFORD-TAYLOR—BUCKLEY.—On June 1st, at St. Nicholas' Church, Blundellsands, by the Rev. Dr. Guest, M.A., Major R. Stopford-Taylor, R.A.M.C. (T.F.), to Marion Gertrude, only daughter of William Buckley, J.P., of Salisbury House, Blundellsands, Liverpool.

STRADLING—KELLY.—On June 1st, at Corpus Christi Church, Wokingham, Frank Bedford Stradling, L.D.S., to Aileen, third daughter of Mr. and Mrs. Patrick Kelly, of Limerick.

WYATT—BRIGGS.—On May 31st, at St. James's Piccadilly, H. D. Wyatt, M.D., of Green Ladies, Godalming, to Gertrude May Briggs, widow of Charles Briggs, of Norwood.

## DEATHS.

AUSTIN.—On June 5th, at Moorfield-road, West Didsbury, Manchester, Elfred Chalmers Austin, Captain, R.A.M.C., in his 40th year.

CENTER.—On April 28th, at the Royal Naval Hospital, Bighi, Malta, William Rudolf Center, M.B., Fleet Surgeon, Royal Navy, of wounds received on April 27th, when H.M.S. *Russell* was sunk in the Mediterranean.

ELLIMAN.—On June 3rd, at Bella Vista, San Remo, Italy, Arthur Charles Elliman, M.R.C.S., L.R.C.P., aged 50 years.

FITZGERALD.—On May 27th, Charles Edward Fitzgerald, M.D., Honorary Surgeon Oculist to His Majesty in Ireland.

WILKINSON.—On June 5th, at his residence, Twickenham, John Sebastian Wilkinson, F.R.C.S., in his 81st year.

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*N.B.—A fee of 5s. is charged for the Insertion of Notices of Births, Marriages, and Deaths.*

# Notes, Short Comments, and Answers to Correspondents.

## VITAL STATISTICS OF NYASALAND.

A REPORT on the Blue-book of the Nyasaland Protectorate for the year 1914–15, prepared by Mr. A. M. D. Turnbull, Assistant Chief Secretary, has been received at the Colonial Office and presented to Parliament. From this it appears that the number of Europeans resident in the Protectorate, comprising officials and non-officials, was 831 (587 males and 244 females), and the Asiatic population numbered 410. The native population is estimated to consist of 486,908 males and 602,390 females. There were 32 European births and 12 deaths during the year, showing a birth-rate of 38·38 and a death-rate of 14·44 per 1000. The health of the European officials was not so satisfactory as in the previous year, but the general health of the Protectorate was good, and there was no outbreak of disease in epidemic form. Thirty-nine cases of sleeping sickness were reported, as compared with 64, 46, and 38, respectively in the three preceding years, but, owing to the partial suspension of investigations and the illness of one of the medical officers, it would be misleading to base upon these figures any conclusions as to the progress or otherwise of the disease. The total number of cases which had been discovered in the Protectorate up to the end of 1914 was 211. Of the cases diagnosed in the year under review, 25 were males and 14 females, the proportion of approximately 2 males to 1 female continuing to be noticeable. Death has supervened as a rule in from three to five months from the probable date of infection, all the cases having proved fatal. Of diseases of the infective group, malaria was again the most prevalent, the others in order of frequency being dysentery, syphilis, gonorrhœa, pneumonia, chicken-pox, whooping-cough, and yaws. Under the head of general diseases, rheumatism in its various forms accounted for practically all the admissions. Injuries and ulcers furnished, as usual, a large proportion of the cases treated; and next in order of frequency were digestive and bowel complaints, bronchitis, conjunctivitis, and diseases of the connective tissue.

## "CHINESE TOE-ROT."

A CASE described by a correspondent (R. G.) as "Chinese toe-rot," in which for several years the skin between adjacent toes hypertrophied and peeled off, leaving a tender, raw, and itching surface, is probably an example of the condition described many years ago by Mr. James Cantlie as "foot-tetter," and referred to under this name in the "Manual of Tropical Medicine" of Castellani and Chalmers. In foot-tetter the condition of the toes is but a part of a more general affection. The soles and sides of the feet become involved, and the condition may spread to the hands, the perineum, umbilicus, and occasionally to the armpits. By its persistence and constant annoyance it is calculated to cause nervous depression. Mr. Cantlie found in all the parts involved a diplococcus which was readily cultivated, and when inoculated into his own forearm caused a local condition similar to that met with at the original site of infection. The infection is very persistent, lasting in some instances 20 years after leaving the tropics. Fading to insignificant proportions in winter, it tends to return each year during the hot weather. Treatment consists in frequent washing in hot water, followed by scrupulously careful drying. Blisters are pricked and any loose skin removed. Lotio calcis sulphuratæ is very lightly mopped twice daily on the affected spots and allowed to dry, the inside of the socks freely dusted with equal parts of sulphur and boric powder, and the same powder applied to every part of the interior of the shoe. This treatment must be continued for some time and the shoes treated for a couple of months after disappearance of the symptoms. As the infection is doubtless kept up by the presence of the organisms in the shoes themselves, further methods of disinfection may be required for these, or, preferably, their destruction.

## WANTED: A SKELETON.

*To the Editor of* THE LANCET.

SIR,—Will any reader of your journal be kind enough to lend a skeleton for the purpose of teaching first-aid to some senior cadets. It would be taken great care of and returned when done with by

Yours faithfully,

22, Newton-road, W., June 5th, 1916. P. POPE, M.R.C.S.

## HENRY LAWRENCE'S "TREATISE ON HERNIA, 1807."

THE Secretary of the Royal Society of Medicine writes to say that the library copy of Henry Lawrence's "Treatise on Hernia, 1807," has been destroyed by mice, and that he would be very grateful to any reader who would put him in the way of finding a sound copy.

## REPORT OF THE SCHOOL MEDICAL OFFICER FOR BIRMINGHAM: AN EXPLANATION.

IN the notice of the report of the school medical officer for Birmingham in our issue of May 20th, p. 1055, an apparent discrepancy was alluded to in reference to the number of children treated for defective teeth. It should be mentioned that the larger figure referred to (17,301) indicates the number of *attendances*, not the number of individual cases.

*G. P.*—The following books are suitable for the purpose:—"A Manual of Surgery." By William Rose, F.R.C.S., and Albert Carless, M.S. Ninth edition. London: Baillière, Tindall, and Cox. 1911. Price 21*s*. "A Text-book of Surgery." By Richard Warren, M.D., M.Ch. Oxon., F.R.C.S. Eng. In two vols. London: J. and A. Churchill. 1915. Price 25*s*. net. "A Manual of Surgery." By Alexis Thomson, M.D., F.R.C.S. Edin., and Alexander Miles, M.D., F.R.C.S. Edin. In three vols. Fifth edition. London: Henry Frowde and Hodder and Stoughton. 1915. Price 10*s*. 6*d*. net per volume. "The Practice of Surgery." By Russell Howard, M.S., F.R.C.S. London: Edward Arnold. 1914. Price 21*s*. "The Practice of Surgery." By W. G. Spencer, M.S., F.R.C.S., and G. E. Gask, F.R.C.S. London: J. and A. Churchill. 1910. Price 25*s*. net.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

## BOOKS, ETC., RECEIVED.

BLANCHARD COMPANY, Pittsburg, Pa.
The Tonsil and Its Uses. By Richard B. Faulkner, M.D. (Columbia University). Price $1.00.

CHAPMAN AND HALL, London. JOHN WILEY, New York.
Microscopy of Vegetable Foods. By A. L. Winton, Ph.D., and others. Second edition. Price 27*s*. 6*d*. net.
Sewerage Designing, Construction, and Maintenance of Sewerage Systems. By A. Prescott Folwell. Seventh edition, revised and enlarged. Price 12*s*. 6*d*. net.

FANNIN AND CO., Grafton-street, Dublin. SIMPKIN AND MARSHALL, London. JAMES THIN, Edinburgh.
History of the Royal College of Surgeons in Ireland and of the Irish Schools of Medicine, including a Medical Bibliography and a Medical Biography. By Sir Charles A. Cameron, C.B., Honorary Secretary and Past President. Second edition, revised and enlarged.

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PRUDENTIAL PRESS, Newark, New Jersey.
Mortality from Cancer Throughout the World. By F. L. Hoffman, LL.D., F.S.S., F.A.S.A.

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SMITH, ELDER, AND CO., London.
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The Milk Problem in Indian Cities, with Special Reference to Bombay. By L. L. Joshi, B.Sc., M.D. With a Foreword by J. A. Turner, C.I.E., M.D., D.P.H.

VIVES, J., Muntaner 22, Barcelona.
Tratado de Pediatria. By Dr. Andres Martinez Vargas. Vol. I.

**The following magazines, journals, &c., have been received:**—British Dental Journal, New Zealand Medical Journal, Interstate Medical Journal, Journal of the Royal Sanitary Institute, Man, Canadian Practitioner and Review, American Journal of Public Health, Canadian Journal of Medicine and Surgery, Medical Clinics of Chicago, American Journal of Obstetrics, British Journal of Children's Diseases, Revue de Médecine, Therapeutic Gazette, Medico-Legal Journal, Revue de Chirurgie, Saint Paul Medical Journal, Archives of Internal Medicine, Pacific Medical Journal, Journal of Mental Science, Journal of Bacteriology, Cleveland Medical Journal, Royal Prince Alfred Hospital Gazette, &c..

# Medical Diary for the ensuing Week.

## SOCIETIES.

**SOCIETY OF TROPICAL MEDICINE AND HYGIENE**, 11, Chandos-street, Cavendish-square, W.

FRIDAY.—5.30 P.M., Annual General Meeting. Mr. J. Cantlie: Topography of the Liver in Relation to Liver Abscess.—Dr. G. C. Low: An Interesting Case of Syphilitic Pyrexia in an Indian Native. The Value of a Positive Wassermann Reaction in Diagnosis.

## LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

**POST-GRADUATE COLLEGE**, West London Hospital, Hammersmith road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.
TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.
THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.
FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

**NORTH-EAST LONDON POST-GRADUATE COLLEGE**, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham): Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).
WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).
THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie). 4.30 P.M., Special Demonstration:—Dr. A. J. Whiting: Selected Medical Cases.
FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

**THE THROAT HOSPITAL**, Golden-square, W.

MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.
THURSDAY.—5.15 P.M., Clinical Lecture.

**CHADWICK PUBLIC LECTURES**, Town Hall, Ilford, E.

Course of Three Lectures on the Prevention of Disease and Frostbite in the Army.

FRIDAY.—8 P.M., Lecture II.:—Professor S. Delépine: Experiments on Frigorism (illustrated by diagrams and lantern slides).

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IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

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Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

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## MANAGER'S NOTICES.

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**January to June, 1916.**

IN view of the Government restrictions upon the supply of paper, and the shortage of paper quite apart from these restrictions, we cannot include, as usual, in all the copies of THE LANCET the Index and the Title-page which are due at the end of this month. The Index and Title-page will, of course, be prepared, and copies will be supplied gratis to subscribers on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such application should please be sent in at once.

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## METEOROLOGICAL READINGS.

*(Taken daily at 8.30 a.m. by Steward's Instruments.)*

THE LANCET Office, June 7th, 1916.

| Date. | Barometer reduced to Sea Level and 32° F. | Direction of Wind. | Rainfall. | Solar Radio in Vacuo. | Maximum Temp. Shade. | Min. Temp. | Wet Bulb. | Dry Bulb. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| June 1 | 30·060 | S.W. | ... | 101 | 64 | 54 | 54 | 58 | Cloudy |
| ,, 2 | 30·000 | W. | ... | 125 | 66 | 50 | 51 | 57 | Cloudy |
| ,, 3 | 29·980 | N.W. | ... | 119 | 61 | 47 | 48 | 53 | Cloudy |
| ,, 4 | 29·760 | S.W. | 0·33 | 106 | 61 | 46 | 50 | 56 | Cloudy |
| ,, 5 | 29·320 | S.W. | 0·19 | 117 | 61 | 51 | 50 | 55 | Cloudy |
| ,, 6 | 29·883 | W. | 0·05 | 114 | 60 | 49 | 50 | 53 | Cloudy |
| ,, 7 | 29·650 | W. | ... | 113 | 57 | 45 | 49 | 54 | Cloudy |

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